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AIR REFUELING OPERATIONS IN THE NORTH PACIFIC:  
IS THERE A MORE EFFICIENT METHOD?

GRADUATE RESEARCH PAPER

Michael J. Rauenhorst, Major, AKANG

AFIT/GMO/LAS/98J-15

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DEPARTMENT OF THE AIR FORCE  
AIR UNIVERSITY  
**AIR FORCE INSTITUTE OF TECHNOLOGY**

Wright-Patterson Air Force Base, Ohio

19981009 054

AFIT/GMO/LAS/98J-15

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Presented to the Faculty of the Graduate School of  
Logistics and Acquisition Management of the

Air Force Institute of Technology

Air University

Air Education and Training Command

In Partial Fulfillment of the  
Requirements for the Degree of  
Master of Air Mobility

Michael J. Rauenhorst, B.S.

Major, AKANG

June 1998

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## **Acknowledgments**

This research project would not have been possible without the help and support of many outstanding individuals. I thank the following individuals for their time and exceptional efforts in the research of this project: Lt Col Dave McCarthy and SSgt Oscar Jimenez, PACAF AMOCC/XOPK; MSgt Tim Bowser and MSgt Tina Wallace, AMC TACC/XOOMK; Lt Col Tim Scott, Lt Col Tom Hutchings, Lt Col Rod Zivanovic, Lt Col Arne Moe, Lt Col Paddy Doyle, Maj Walt Lunsford, Maj Thad Kolwicz, Maj Jay Williams, Maj Carl Lincoln, Maj Scott Ogden, Maj Mark Bour, Maj Bob Thompson, Maj Dave Lowell, SSgt Greg Paul and SSgt Jim Wolverton, 168 ARW; MSgt Edward Rogers, AMC/MRO; Maj Steve Andrasz of the Air Force Cost Accounting Agency; and Maj Cliff Rotti, ANG/DOXF.

My deepest appreciation also goes out to Dr. Roland Kankey for his support, counsel, and direction in completion of this research project. His advice and inputs enabled me to focus on the objectives at hand.

Most importantly though, I would like to thank my wife Tanya, my son Joseph, and my daughter Kayla, for their support and patience throughout the entire ASAM program. The long hours and time away from home kept me away from family “quality time” too many times to count. However, their love and understanding was essential in allowing me to complete both this project and the ASAM program.

Michael J. Rauenhorst

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### **Abstract**

The 1997 Air Force Long Range Plan states the Air Force will continue to rely on the Air Reserve Component (ARC) in an integrated Total Force. Driven by the desire to maximize efficiency and operational effectiveness within allocated resources, the Air Force will continue to look for new opportunities, to include examining ARC involvement in new mission areas and optimizing the reverse associate unit. The best location to attempt either a KC-135 reverse associate unit or a non-traditional Air National Guard KC-135 squadron might be in the North Pacific Theater. Both options would help reduce the operations tempo of KC-135 squadrons, might help with aircrew retention, and would increase the reliability and cost effectiveness of air refueling operations in the North Pacific.

This paper performs a cost-benefit analysis on several proposals to satisfy the air refueling requirements in the North Pacific in a more cost efficient manner than today's current operations. Results of this study reflect an overall cost savings and more efficient use of air refueling resources with an increase in the number of KC-135Rs assigned to or associated with the 168<sup>th</sup> Air Refueling Wing. This paper examined several basing options and the associated costs and benefits.

AIR REFUELING OPERATIONS IN THE NORTH PACIFIC:  
IS THERE A MORE EFFICIENT METHOD?

**I. Introduction**

**Background**

Air refueling operations and the Strategic Air Command's Alaska Tanker Task Force (ATTF) can be traced back to the 4175<sup>th</sup> Strategic Wing and its replacement (on 25 March 1967), the 6<sup>th</sup> Strategic Reconnaissance Wing (6 SRW). The 6 SRW maintained a detachment at Shemya Air Force Base, Alaska, in addition to maintaining the Alaskan Tanker Task Force at Eielson AFB in support of strategic reconnaissance and North American Air Defense (NORAD) intercept sorties. To accomplish the air refueling support mission, the ATTF was comprised of ten to fifteen KC-135s temporarily deployed to Eielson for 30 – 45 days at a time (10). A new Air National Guard unit, the 168<sup>th</sup> Air Refueling Squadron (168 ARS), was activated in September 1986, at Eielson AFB. Initially, the 168<sup>th</sup> was comprised of four KC-135E tankers, but soon increased to a group status with ten KC-135Es, and is now an Air Refueling Wing (ARW) comprised of nine KC-135Rs. December 1991 reflected the end of the cold war when the 6 SRW's reconnaissance mission was transferred to the 55<sup>th</sup> Wing (55 WG) at Offutt Air Force Base, Nebraska and the mission of the Alaskan Tanker Task Force was terminated. The 6 SRW inactivated 1 September 1992, leaving the Alaska Air National Guard's 168 ARW as the sole air refueling unit permanently based in the North Pacific Theater.

The air refueling requirements and requests in the North Pacific have increased each year since the inactivation of the ATTF. This increase is a result of the following events:

- 1) Two additional fighter squadrons moving to Alaska (one at Eielson and one at Elmendorf AFB) in the early 1990s.
- 2) The Pacific Air Force's premier exercise, Cope Thunder, moving to Eielson AFB in 1991.
- 3) The increased refueling requirements for the 55 WG's RC-135s as they now operate from Eielson AFB versus Shemya AFB when they belonged to the 6 SRW.
- 4) The increased air refueling requirements to support daily AMC C-17 airlift missions.
- 5) Increasing reliance on KC-135s to move fighters during Coronet movements due to the reduced availability of KC-10s (31).

As an air refueling wing with eight Primary Aircraft Authorization (PAA) and one Backup Aircraft Inventory (BAI), the 168<sup>th</sup> easily exceeds the mission success rates of the ATTF (38:1). However, even with an aircraft utilization rate of 100%, the 168<sup>th</sup> alone can not support all of the air refueling requests in the North Pacific. Thus, Air Mobility Command (AMC) and Pacific Air Forces (PACAF) must deploy tankers to either Eielson AFB or Elmendorf AFB in Alaska to support air refueling requirements that the 168<sup>th</sup> cannot fill.

### **Statement of the Problem**

In FY97, the USAF spent almost 700 flying hours, and under the current method of operations will spend more than 850 flying hours simply to position/deposition tankers

(mostly KC-135s) in Alaska. When those deployed tankers are not sitting alert or not flying due to the cancellation of the receiving aircraft, they are using another 1,100 – 1,200 flying hours to support air refueling requirements in the North Pacific. Goal 4a of the AMC Strategic Plan includes the elimination of non-value added activities as a method to help reduce Operations Tempo (OPSTEMPO) (13:8). Many of the air refueling requirements that require the deployment of KC-135s to Alaska could be classified as non-value added activities. For every one hour a deployed KC-135 is employed in Alaska, it spends another 45 minutes to simply position/deposition itself. The 100 ARW at Mildenhall AB in the United Kingdom had a similar, but much larger, requirement for deployed KC-135 support. The 100 ARW is currently increasing its size from nine authorized KC-135Rs in Fiscal Year 1998 (FY98) to a 15 PAA wing by 1 October 1998 (41). Consequently, the baseline requirement for KC-135s to deploy to Mildenhall to support the European Tanker Task Force (TTF) has been reduced from an original requirement of eight at a time down to zero once the additional six KC-135Rs become operational. Additional KC-135s may be required to deploy to Mildenhall to augment the 100 ARW when dictated by operational requirements, but it won't be on a continuous basis (14). In a similar situation, the requirement for tankers to deploy and support the Strategic Air Command's (SAC) Pacific Tanker Task Force was eliminated when the 909<sup>th</sup> Air Refueling Squadron (18<sup>th</sup> Wing (18 WG), Kadena AB, Japan) was increased to a 15 PAA KC-135R squadron in the early 1990s (26).

The purpose of this paper is to first present the facts and costs to continue positioning tankers in Alaska to fill the air refueling requirements that the 168<sup>th</sup> cannot fill due to lack of airframes. This paper will then present four proposals to reduce the

number of KC-135s required to deploy to Alaska. Each proposal is orientated towards providing a more efficient use of KC-135 resources (airframes and personnel) to the USAF based upon the goals and statements contained in the USAF and ANG long range plans.

### **Air Force and Air National Guard Long Range Plans**

The 1997 Air Force Long Range Plan (LRP) states the Air Force will continue to rely on the Air Reserve Component (ARC) in an integrated Total Force. Driven by the desire to maximize efficiency and operational effectiveness within allocated resources, the Air Force will continue to look for new opportunities, to include examining ARC involvement in new mission areas and optimizing the reverse associate unit concept. This assumes there will continue to be a variety of reasons to assign forces to the reserve components, and a variety of programs available. However, ARC forces are not the answer to every requirement. The end state is a Total Force that is *efficient* and *operationally effective*, that is sustained through a continuous review of the Active/Reserve force mix seeking opportunities to shift missions and activities into the ARC (7:14).

Volume II of the Air National Guard Long Range Plan for 1998 contains an *ad hoc* committee report on changes to force mix and force structure. The purpose of this report was twofold: to present criteria which may be used to test the suitability of a proposed new mission to the Air National Guard (force mix), and to establish a method to identify those units/states that are candidates for robusting, mission changes, reductions,



or divestitures (force structure) (30:18). The ANG LRP states the principles for determining the active-ANG force mix and force structure changes are:

- 1) **The Defense of the United States must be first priority** – The need for an adequate military in an unstable, hostile world, and limitations on available dollars demand that Active/ANG force mix decisions be made in the best interest of the United States.
- 2) **National Command Authority is Supreme** – In addition, nothing in the ANG LRP or in this paper should be construed to supersede the acknowledged superior authority of the National Guard Bureau, the United States Air Force, and the Department of Defense over the activities of the Air National Guard.
- 3) **The Traditional Character of the Air National Guard Should be Preserved** – The Air National Guard is a non-mobilized militia force. Force Mix planning and decisions should not fail to recognize the constitutionally based charter of the ANG to perform a dual state/federal mission using non-mobilized citizen airmen. The following concerns must be considered by decision makers:

- The ANG cannot reasonably be expected to mirror Active Duty performance during peacetime in all instances.
- Planners and decision makers should be sensitive to the time demands that mission taskings place upon the traditional citizen-airman. These non-mobilized ANG personnel may be performing to the limit of their capacity given their responsibilities as private citizens and civilian employees. Excessive military demands may damage morale, erode employer support of the Guard and Reserve, compromise recruiting and retention efforts and

require changes in the full-time/part-time personnel mix that will reduce cost effectiveness.

- 4) **Integrity in Planning is Essential** – All planning and decision making should readily acknowledge the limitations as well as the strengths of the ANG. Otherwise, the ANG may be inclined to accept new roles and missions without adequate funding, or under conditions that could produce demands that would undermine the cost savings inherent in militia service. The central paradox of how to preserve the traditional character of the ANG while simultaneously honoring the Total Force Policy of seamless integration with the Active Air Force is acknowledged.
- 5) **Force Structure Database** – While subjective socio-political considerations play in any basing decision, it is imperative that the decision-maker have available up-to-date factual data on a unit's/state's ability to perform in a current or proposed mission. It is fundamental to the process that the ANG Force Structure Matrix be used in conjunction with the Force Structure Database at Air National Guard Readiness Center (30:19).

## **II. Air Refueling Operations in Alaska**

### **Alaska Tanker Task Force**

Managed by the 6<sup>th</sup> Strategic Reconnaissance Wing (6 SRW), the Alaska Tanker Task Force (ATTF) was the last permanent active duty tanker presence in Alaska. Because it was composed of strictly deployed (TDY) KC-135s, the ATTF did not have to worry about phase inspections, losing airframes to Post Depot Maintenance (PDM), or reserving sorties for aircrew training. The 6 SRW had full access to the ten – fifteen KC-135s it deployed on the Eielson ramp. The two primary missions the ATTF supported were the 6 SRW's RC-135 reconnaissance squadron and the Alaska NORAD Region's (ANR) air defense mission, with a secondary mission to support the three fighter squadrons in the Alaskan Air Command. The RC-135 support mission was reasonably successful. The 6 SRW had enough primary and spare airframes to ensure the required number of KC-135s launched to support the RC-135s. However, the air defense mission was a different matter. ANR reported to the 168 ARW/DOX shop in 1994 that the ATTF only launched 50% of the time, and their average launch time when they did get into the air was two hours after notification. By contrast, since assuming the ANR hard alert mission in 1992, the 168 ARW has launched 100% of the time with an average response time of about 35 minutes (10). Two fundamental factors account for this. First, deployed aircraft are not climatized to the arctic environment as well as permanently assigned aircraft. The experience obtained by the 168<sup>th</sup> when the unit was activated in 1986, and again when it converted to KC-135Rs in 1995, demonstrates that it takes a year to fully

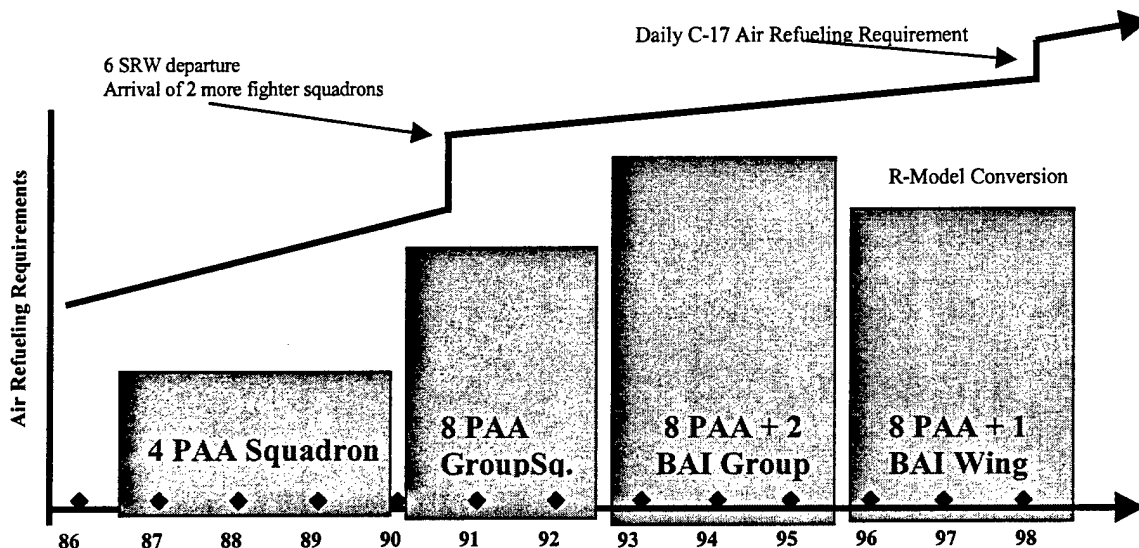
climatize a KC-135 to make it reliable in arctic conditions. Wheel struts for KC-135R models, rudder PCUs, windscreens, hydraulic components, and avionic components all caused the 6 SRW to dread the arrival of a “lower 48” tanker. Cold-weather acclimating a KC-135 takes many months of time-consuming repairs. For the 168<sup>th</sup>, this process takes an entire winter of components, seals, and fluid changes (38:9). The second factor is the wing’s staff and aircrews’ knowledge gained from operating in the arctic environment. On two occasions in the last few years, an ANG and an Active Air Force KC-135 aircraft commander have elected to dismiss 168<sup>th</sup> recommendations not to de-ice their aircraft in –30F plus weather. The results: the aircraft required two and three days respectively to thaw in a heated hangar before being able to depart Eielson AFB (24).

### **168th Air Refueling Wing (168 ARW) and Eielson AFB**

Since its activation in 1986, the 168 ARW has grown from a four PAA (Primary Aircraft Authorization) KC-135E squadron, to an eight PAA plus two BAI (Backup Aircraft Inventory) KC-135D/E group, to an eight PAA plus one BAI KC-135R wing in 1995. The 168 ARW is the logical first choice for supporting air refueling requirements for not only 11<sup>th</sup> Air Force assets in Alaska, but for any air refuelable aircraft deploying to or transiting the North Pacific Theater. Having essentially taken over the role of the ATTF and exceeding their mission success rates (38:1), the 168 ARW has become the primary tanker support unit for the 55 WG RC-135 Cobra Ball aircraft transiting and operating in the North Pacific theater, with active duty KC-135Rs from either the 92<sup>nd</sup> Air

Refueling Wing (Fairchild AFB) or the 909<sup>th</sup> Air Refueling Squadron (Kadena AB) augmenting the 168<sup>th</sup> when required.

The North Pacific Theater's air refueling requirements have increased regardless of the amount of KC-135s assigned to the 168 ARW. Figure 1 is a very simplified depiction of the major growth increase in air-to-air refueling and airlift requirements.



**Figure 1. 168 ARW Activity Level Relative to Major Growth Phases (22:3)**

**Location.** The 168 ARW's strategic location and air refueling missions create a unique situation for any air refueling organization located in the state of Alaska. Any major northern Pacific Command (PACOM), Strategic Command (STRATCOM), or North American Air Defense (NORAD) Command war plan will require a tanker task force presence in Alaska. Chances are, any contingency or major humanitarian operation in PACOM, but especially in the Far East, will also require an Alaskan-based tanker task force presence to support deploying airlifters and combat air forces.

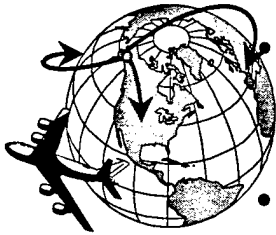
Eielson AFB is located in the interior of Alaska. It is in an excellent location for the North Pacific Route structure and is virtually equal distant from Europe and Asia.

The base is located north of the westbound Air Traffic Control Center (ARTCC) corridor. The 168 ARW currently conducts a large portion of its operations in the North Pacific while accessing this route structure. There is an understanding between 168 ARW aircraft and ARTCC that makes this transition in these areas seamless (22:3).

**“Alaska is the most central place in the world for aircraft and that is true of either Europe, Asia, or North America. I believe in the future, he who holds Alaska will hold the world, and I think it is the most important strategic place in the world.” Brig. Gen. William “Billy” Mitchell, 1935. (18:1)**

When Billy Mitchell passionately spoke 60 years ago of Alaska’s military importance, he—in his own way—was describing today’s “Global Reach, Global Power” concept. Lying on the Great Circle Route connecting Asia and Europe with North America, Alaska is ideally suited for deploying aircraft, troops, and equipment around the world. It does not take a map maker to realize 11<sup>th</sup> Air Force’s “composite wing” type force is much closer to Pacific hot spots than the composite wings in the Continental United States (CONUS). More importantly, there is only a minimal difference in deployment times to Europe from East Coast units (18:2).

KC-135s stationed in Alaska can deploy to or support forces deploying to Europe or Asia due to the following facts:



- The European continent is easily accessible, as is the Persian Gulf.
- The Asian continent is the same distance, in some cases shorter, than Europe. Both are about eight hours flying time.
- Hawaii, a staging point for the southern PACAF AOR, is only six hours flying time.
- The CONUS west coast is only three hours away, which makes it possible to conduct operations near the west coast that originate in Alaska without substantial mission degrade. (22:3)

**Facilities.** The 168<sup>th</sup> Operations Group building was designed for a four PAA squadron, but has supported the eight PAA squadron in an adequate manner. A few Operations Support Flight functions have been relocated to the wing headquarters building. The Operations building, which was completed in January 1995, should be able to support an increase of four PAA or operate a TDY Tanker Task Force. If the air refueling squadron was increased beyond a twelve PAA squadron, or a second flying squadron was assigned to the wing, a second squadron operations building would have to be located and acquired.

The 168<sup>th</sup> Logistics Group (LG) possesses the newest buildings within the 168<sup>th</sup>. The one-bay maintenance hangar with the LG office facilities was completed in 1990. This facility was designed to support a four PAA squadron and is engineered to have a second bay added to it for a cost of around \$5 - \$6 million (34). A state-of-the-art one-bay fuel cell facility was completed in 1997. Both of these facilities are able to

accommodate all aspects of KC-135 maintenance. The old 6 SRW (SAC) hanger (known as Thunder Dome), currently managed and operated by the host unit (354<sup>th</sup> Fighter Wing) to support seasonal Cope Thunder deployed fighter forces, is capable of fully housing three KC-135s at one time. The 168<sup>th</sup> does use this facility on occasion when available through a Memorandum of Agreement (MOA) with the host unit. The Jet Shop is a fully integrated modern facility incorporating three work bays and two 10,000lb lifts capable of supporting each bay. The shop was designed to support both TF-33 (E-model engines) and CFM-56 (R-model engines) operations and is designed for easy access from the flightline with overhead doors that open to the main hangar. The 168 maintenance jet shop served as a Jet Engine Intermediate Maintenance (JEIM) facility for a period of five years and most current personnel have experience in "E" and "R" model operations. Full support for tanker operations includes a new state of the art avionics repair facility and on-site Non-Destruction Inspection capability (22:4). The supply building, completed in 1989, might require an addition if anything more than a four PAA increase or four KC-135 TTF was to be established at Eielson.

The 168<sup>th</sup> Support Group, along with the active duty's 354<sup>th</sup> Fighter Wing, has the support capabilities, and if needed, growth capability to handle increased tanker operations at Eielson AFB.

**Customers and Flying Commitments.** Figure 2 shows the level of support the 168 ARW has provided to the primary customers in the North Pacific Region. The primary customers are broken into four categories: HQ PACAF directed (to include 11 AF fighter currency), ANR/11AF (NORAD and 11 AF exercise support) support, Higher Headquarters Directed missions (such as Chairman, Joints Chief of Staff taskings),



“Other” types of support (such as AMC airlift/channel support), and Alaska Air National Guard training that includes ANG unique or specific missions.

The following paragraphs provide a brief description of the air refueling requirements for each customer listed in Figure 2 (38:3-7). Reference Appendix A for more detailed information.

1) HQ PACAF Directed:

***PACAF 51-Series Training*** – PACAF (11 AF) has 51-series training (air refueling currency) requirements for 90 fighter aircraft (36 F-15C, 18 F-16, 18 F-15E, 18 A/OA-10) and 2 E-3B/C which must be continuously satisfied.

***Cope Thunder*** - As PACAF’s largest exercise, Cope Thunder applies and tests the combined war fighting doctrine in a dynamic scenario that trains all elements of the war fighting team. Since its move from the Philippines in 1991, Cope Thunder has grown in the number of participants in each exercise. With its combined training airspace covering an area roughly the size of Kansas, Cope Thunder participants enjoy one of the world’s largest Air Combat Maneuvering Instrument (ACMI) ranges (38:5).

Not only does the 168th host all Cope Thunder tanker operations; it also provides much of its Air Refueling (A/R) support. It does this by providing most of the tanker planning and support staff and by optimizing its training by providing as many as eight sorties/day in support of Cope Thunder training periods. However, this support does not come without cost. During all Cope Thunder exercises, virtually all 11 AF air refueling currency training is terminated. During Cope Thunder exercises, the 168th is forced to limit additional A/R support to higher priority air refuelings. During Cope Thunder 94-2 and 94-3, the 168th canceled 22 Cope Thunder sorties in support of higher priority air refuelings (38:5). As an average, the 168<sup>th</sup> is forced to cancel out of three to four days of Cope Thunder exercise each year due to HHD missions (38:5). Reference Appendix B for FY 97 and FY98 exercise participants.

Spare required: NO

Number of exercises per year: 4

Length of exercises: 12 days

Number of aircraft required per day: 2

***Coronet West / Force Extenders*** - These taskings are MAJCOM directed movements of fighter assets to and from forward operating areas. The use of Coronet West movements over the “Northern Air Bridge” is generally limited during the winter months due to available alternate airfields. Slips of one or more days are common.

Spare aircraft required: Situation Dependent

Avg. number of requests/year: 49

Average number of requests flown per year: 22  
Average number of aircraft required: 3 (2 primary, 1 Spare)

2) ANR/11 AF

***Alaska NORAD Region (ANR) Hard Alert*** – ANR funds one KC-135R and crew plus crew chiefs to be on a hard alert 24 hours a day, 365 days per year, capable of being airborne within one hour after notification. The aircrew and crew chiefs are billeted in the former SAC alert facility maintained and operated by the 168 ARW. This NORAD alert tankers flies about 21 times per year and acts as a spare for Pony Express missions and other real world high priority taskings upon approval by ANR.

Spare aircraft required: NO  
Avg. number of request/year: 21 from ANR  
Average number of missions flown per year: 25  
Average number of aircraft required: 1

***Amalgam Warrior & Fencing Virgo/Spade*** – These taskings are HQ NORAD and Alaska NORAD Region exercises of ANR OPLAN 3310. ANR Exercises are planned and flown using ANR assets only. Tanker assets are committed for two or three day windows for ANR exercises and three to five days for Amalgam Warrior. Reference Appendix B for FY97 and FY98 exercise participants.

Spare aircraft required: YES  
Average number of exercises per year: 3  
Average number of aircraft required: 3 (2 primary, 1 spare)

***Northern Edge*** – This JCS Exercise involving around 6,000 personnel and up to six C-141 aircraft supporting US Army airdrop operations. Exercises focus on intra-theater command relationships utilized under a large scale contingency operation. Reference Appendix B for FY97 and FY98 exercise participants.

Spare aircraft required: NO  
Number of exercises per year: 1  
Length of exercise: 10 days  
Average number of aircraft required per day: Part of Cope Thunder

3) Higher Headquarters Directed (HHD):

***Busy Relay / Pony Express*** – Busy Relay missions are no-notice JCS directed Air Refueling taskings in support of RC-135 movements to and from forward operating areas. Pony Express tasking details are classified.

Spare aircraft required: YES, for Pony Express missions

Average number of Busy Relay & Pony Express requests/yr.: 72  
Number of taskings flown/year: 36  
Average number of aircraft required: Up to 4 (2 primary, 2 spare)

***Other HHD taskings*** - Many taskings the 168th receives occur on an infrequent basis. A partial list includes cold weather testing of C-17s and B-1s, B-1 Global Power missions, PACAF inspection support, Combat Hammer, Polar Thrust, classified taskings, and E-4 overflight support. All require a varying degree of support and prior notice.

#### 4) OTHER

***AMC Channel Mission (Airlift) Support*** – This tasking is a Higher Headquarters Directed (HHD) Air Refueling request for AMC airlift assets flying the “Northern Air Bridge” to destinations within Asia. When KC-135s were replacing the C-141 in this airlift requirement, the need for A/R support dropped dramatically. Beginning in FY98, only one channel mission requires air refueling support from Alaska. It is a C-17 flying from Travis AFB, CA to Yokota AB, Japan. The C-17 is scheduled to fly and require an air refueling every day of the year. Currently, AMC deploys a CONUS KC-135 to Elmendorf AFB every Thursday. The deployed KC-135 supports the C-17 channel mission Friday through Tuesday, and returns home on Wednesday. The 168 ARW supports the C-17 mission on Wednesday and Thursday of each week when the TDY tankers are positioning/depositioning themselves. The C-17, as of 12 May 98, is currently canceling 34% of the time primarily due to overtasking of the C-17 fleet and some maintenance reasons (19).

Spare aircraft required: NO

Requirement/year: 365

Average number of missions flown per year: 26 out of an average of 241 required

Average number of aircraft required: 1

#### 5) Alaska Air National Guard (AKANG)

***Alaska Air National Guard specific missions*** – These missions support 168<sup>th</sup> aircrew training specific sorties, National Guard Bureau (NGB) trips, drill weekend shuttle flights to Elmendorf AFB, and various maintenance specific flights such as PDM pick-up, Compass Swing, and parts pickup.

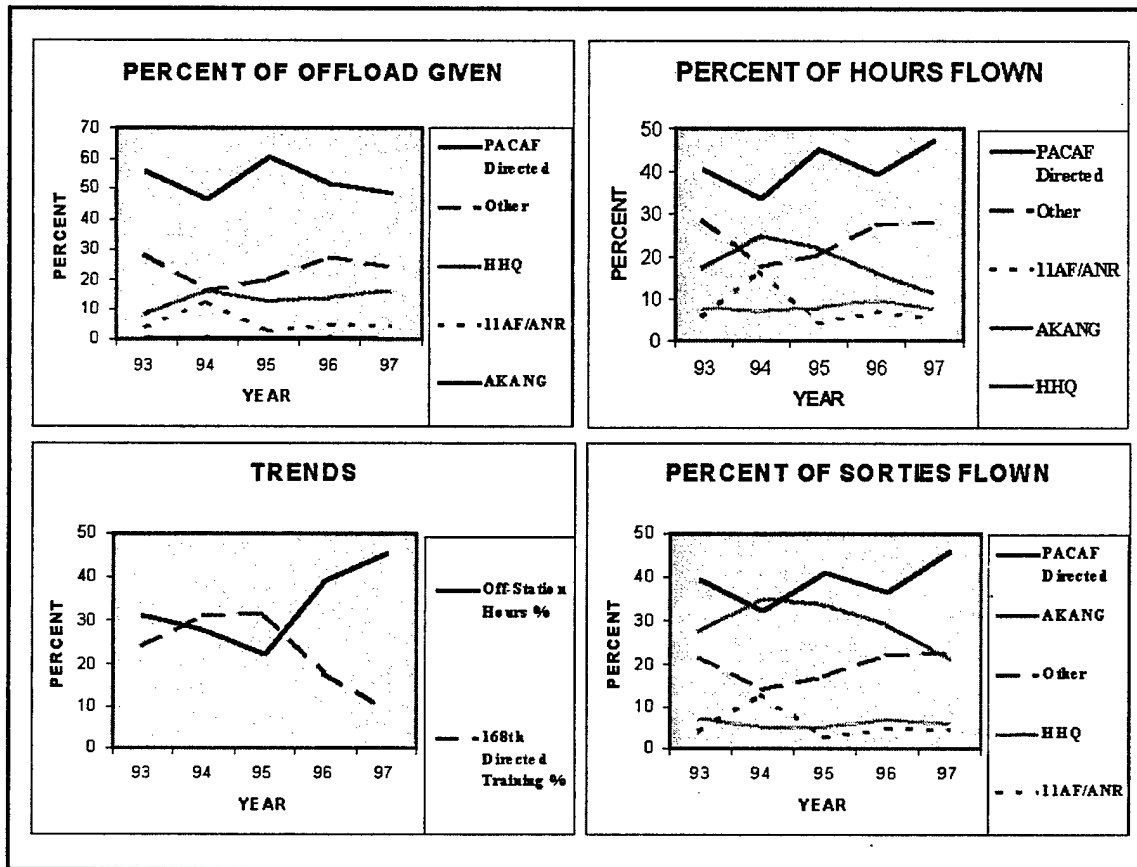


Figure 2. 168 ARW Air Refueling Customers (40)

**Airframe Usage.** The 168<sup>th</sup> is an eight PAA unit plus one Backup Aircraft Inventory (BAI), single squadron, PACAF gained Alaska Air National Guard KC-135 Wing. Although BAI aircraft do not automatically count or translate into manpower or flying hours funding, it does place another airframe on the ramp. As a rule of thumb, on any given day, one KC-135 is in phase maintenance, another is in Programmed Depot Maintenance (PDM), a third is on ANR hard alert, and a fourth is deployed. Thus, in a perfect world with no broken airframes, the 168<sup>th</sup> as an eight PAA plus one BAI wing will have, at most, five fully mission capable (FMC) KC-135Rs sitting on the ramp at Eielson. Over the last year, the 168<sup>th</sup> has had two airframes at a time in PDM, reducing that number to four. Other maintenance functions, such as aircraft washes and home station

checks, along with aircraft returning from a flight broke or breaking on the ramp, reduce those available numbers even further.

Two main factors, weather and operational limitations, force the 168<sup>th</sup> maintenance to operate much differently than any comparable units. The average winter temperature (October-April) at Eielson AFB, AK is -5F. Conditions however, can be extreme with weeks below -50F and “Chinook” winds that can change temperatures 80F within 20 minutes (38:2). Below is an example of some of the procedures the 168<sup>th</sup> must perform to ensure success (42).

- All aircraft must be pre-heated prior to entering below -20F (windscreen will crack).
- As the temperature drops below -20F, the numbers of heaters increase (up to seven simultaneously in the wheel wells, cockpit, lower nose compartment and Auxiliary Power Unit (APU)) to insure proper functioning of components.
- Aircraft wash takes three days (aircraft must be above freezing prior to wash, and dry prior to returning outdoors)



**Figure 3. Heaters on a 168 ARW KC-135R at -30F (Photo by MSGT Kevin Bishop)**

The operational mission of the 168 ARW forces the 168<sup>th</sup> maintenance to perform in a manner different from most units. First, the 168<sup>th</sup> performs lengthy sorties with high offloads. This requires longer aircraft turn times due to high fuel loads, and fewer sorties per phase. The average length of 168<sup>th</sup> sorties is 3.4 hours per sortie compared to 3.0 hours per sortie for most other KC-135 units. Second, given the harsh environment, Partial Mission Capable (PMC) aircraft that would be acceptable to other units flying in the Continental United States (CONUS) must be Fully Mission Capable (FMC) to fly in Alaska (i.e. gyros, transponder, bleed systems) (38:2).

The 168<sup>th</sup> maintenance organization is manned for one eight-hour shift, five days a week. The above requirements and short-notice operational changes force the 168th to issue “comp-time” to its Military Technicians. Through a continuing emphasis in labor relations between Management and the Military Technician, the 168th has forged hard work into mission success (38:2).

These are the maintenance facts the 168<sup>th</sup> routinely faces when deciding which air refueling requirements in the North Pacific it can and cannot support. Alaskan-based

exercises such as Cope Thunders and Amalgam Warriors, plus higher headquarters taskings such as CJSC Pony Express missions, further reduce the number of KC-135s available to support North Pacific air refueling requirements for a week or more at a time. During the month of May 1996, the 168th was forced to refuse the following Air to Air Refueling (AAR) and Airlift (AL) requests due to a shortage of airframes (21:7-8):

- Coronet West 104 (1 May)
- F-15 deployment to Tyndall (1 May)
- Pacer CRAG Testing (2 May, 4 May, 7 May, 17 May)
- Speckled Trout (11 May)
- PACAF/CC alert (15 May)
- PACAF/CC airlift (9-15 May)
- HHQ E-3 AWACS redeployment (18 May)
- RC-135 A/R support (Busy Relay) (20 May)

The month of May 1996 is a typical month for the 168 ARW. In addition to the air refueling currency requirements of 90 Alaskan-based fighters, the 168 ARW is asked to support contingency and alert deployments, North Pacific air refueling requests (such as Coronet West, Force Extender, Busy Relay, and Pony Express missions), JCS, NORAD, and PACAF exercises (to include Cope Thunder, Amalgam Warrior, and Northern Edge), and other airlift and off-station deployments. When the 168th can't support all of these air refueling requests in the North Pacific, PACAF and AMC must either deploy tankers to Alaska or allow the request go unsupported.

### **11<sup>th</sup> Air Force (11 AF)**

As the 6 SRW deactivated, the Alaskan-based USAF assets in the Alaskan Air Command (AAC), Military Airlift Command (MAC), and the Alaskan Air National Guard transitioned into Pacific Air Forces (PACAF) or PACAF-gained assets under the

11<sup>th</sup> Air Force. In addition to all Alaskan-based Air Force assets falling under one Numbered Air Force (NAF) and Major Command (MAJCOM), the next three years produced major modernization upgrades to every flying organization in Alaska. The 21<sup>st</sup> Tactical Fighter Wing was inactivated and the 3<sup>rd</sup> Wing transferred from Clark AB, the Philippines, to Elmendorf AFB in December 1991. The F-15E-equipped 90<sup>th</sup> Fighter Squadron was added to the two F-15C squadrons already at Elmendorf as were the former MAC 517<sup>th</sup> Airlift C-130E squadron and the two-aircraft E-3B/C 962<sup>nd</sup> Airborne Control and Warning Squadron. There were also significant changes at Eielson AFB. The A-10As assigned to the 18<sup>th</sup> Fighter Squadron were replaced with a LANTIRN (Low Altitude Night Attack Infra Red Navigation) equipped block 50 F-16C squadron and an A/OA-10 close air support squadron was activated. Eielson AFB also became the home of the Cope Thunder training exercise series and the Alaskan range complex was greatly expanded and improved to accommodate not only Cope Thunder, but other joint training as well (11:3). The Alaska Air National Guard's two flying groups both upgraded to wing status. The 176<sup>th</sup> Wing gained a rescue squadron and now consists of a C-130H squadron and HC-130/HH-60 rescue squadron. The 168<sup>th</sup> Air Refueling Wing at Eielson, which replaced the ten to fifteen temporary duty KC-135s of the Alaskan Tanker Task Force with ten KC-135Es in 1992, converted to nine KC-135Rs in 1995.

The peacetime air refueling requirements in the Alaskan Theater have increased as a result of the increased 11 AF local fighter deployment and training requirements and the addition of four annual Cope Thunder exercises involving up to 90 aircraft per exercise. Alert requirements requiring a spare aircraft and aircrew for NORAD, PACAF, AMC, and Chairman, Joint Chiefs of Staff (CJCS) taskings have remained significant since



1992 (33 taskings in FY93, 32 in FY94, 31 in FY95, 25 in FY96 and 46 in FY97).

Reference Appendix A for more information. The strategic geographic location of Alaska dictates the inclusion of applicable 11 AF assets in PACAF, NORAD, AMC, and STRATCOM war plans.

**Eielson Air Force Base.** Eielson AFB consists of 63,195 acres of land. Adding 16 remote sites, numbers increase to 899,892 acres of land. The runway runs north and south and is 14,500 feet long. It was extended to its present length in the 1950s to accommodate B-36 aircraft. It is one of the longest paved runways in North America (4:1).

Eielson AFB, home to the 354<sup>th</sup> Fighter Wing and 168<sup>th</sup> Air Refueling Wing, includes all necessary support functions for maintaining a Tanker Task Force operation or an increase in PAA. These functions include maintenance, fuels, supply, and the operations expertise of the 168 ARW (22:4).

- The runway at Eielson AFB is 14,514 X 300 feet with 0% grade.  
There are no obstacles on either departure corridor. Both ends of the runway have been resurfaced recently, with the middle portion scheduled to be accomplished in FY00. The runway is capable of handling high gross-weight aircraft traffic.
- Both approaches (runway 13 and 31) have an operational Instrument Landing System (ILS) and Tactical Air Navigation (TACAN) approach along with a Precision Approach Radar/Approach Surveillance Radar (PAR/ASR) guided capability for runway 31.
- Eielson AFB has a fully manned 24-hour USAF weather station.

- There are 22 aircraft parking spaces for heavy aircraft along with overflow capability along a parallel taxiway (old taxiway 6 for contingencies) as well as eight to ten heavy duty refueling pits.
- Eielson has an active duty Petroleum, Oils, and Lubricants (POL) facility that supports the 354 FW as well as the 168 ARW with an average daily inventory of over 93 million pounds of JP-8 fuel which can be replenished straight from a refinery approximately 12 miles away via two pipelines, rail, and truck.
- Eielson AFB has a complete motor pool and transportation squadron in-place that is capable of supporting TTF operations if required.

**Elmendorf AFB.** Elmendorf AFB is the second largest composite wing in PACAF and the hub for air traffic to and from the Far East. Elmendorf AFB is the headquarters for the Alaskan Command (ALCOM), 11<sup>th</sup> Air Force (11 AF), and Alaskan NORAD Region (ANR). The base consists of 13,130 acres and has two runways. The primary runway is 10,000 feet long with mountains on one end. The other runway is 7,500 feet. The base supports three F-15C/D/E squadrons, a C-130E squadron, and an E-3B/C squadron, as well as transient AMC airlift/tanker support.

The 3rd Wing is the host unit for Elmendorf Air Force Base, Alaska. It is the largest and principal organization in 11th Air Force. Its arctic operations cover the entire Alaskan land mass (some 586,000 square miles) as well as parts of the northern Pacific Ocean, Bering Sea, Aleutian Islands and Polar region -- a total area exceeding one million square miles and extremely dependent on air refueling support. The mission of the 3rd Wing is to provide air superiority and air defense forces to the commander-in-chief,

North American Aerospace Defense Command, as well as mobile, composite tactical air, airlift and airborne warning and control forces to the commander-in-chief Pacific Command (5:2-3).

Operating just across the Bering Strait -- a mere 44 miles from the former Soviet Union -- the 3rd Wing provides air superiority and defense for Alaska with F-15C/D aircraft. The wing supports the Alaskan North American Aerospace Defense Command Region mission and Flexible Alert concept by periodically deploying aircraft and crews to Galena and King Salmon airports. These Forward Operating Bases (FOBs) allow the F-15s a quicker response time for identification of aircraft approaching North American airspace. At Elmendorf, the aircraft stand alert 24 hours a day, 365 days a year (5:3). The 168 ARW ANR alert tanker supports these alert F-15s and AWACS. Without air refueling support, no F-15 intercepts would be possible without it turning into a one-way mission.

In addition, the 3rd Wing supports Pacific Air Forces, as augmented, in the Pacific Command area of responsibility. This mission includes the PACAF's only F-15E "Strike" Eagle squadron, which flies long-range interdiction missions (5:3). Again, these long-range interdiction missions are not possible without significant air refueling support.

## **Pacific Air Forces (PACAF) and Pacific Command (PACOM)**

Pacific Air Forces (white areas on the map), headquartered at Hickam Air Force Base, Hawaii, is one of eight major commands of the U.S. Air Force and is the air component of the U.S. Pacific Command.



**Figure 4. PACAF's Area of Responsibility (37:1)**

**Mission.** PACAF's primary mission is to plan, conduct and coordinate offensive and defensive air operations in the Pacific and Asian theaters. The command provides advice on the use of aerospace power throughout the theater and carries out missions as directed by the commander-in-chief of the U.S. Pacific Command (37:1).

As a major command, PACAF is responsible for most Air Force units, bases and facilities in the Pacific and Alaska. The command ensures that Air Force units in the region are properly trained, equipped and organized to conduct tactical air operations (37:1).

PACAF's area of responsibility extends across more than half the Earth's surface - from the west coasts of the Americas to the East Coast of Africa and from the Arctic to the Antarctic. The area is home for some two billion people in 44 nations (37:2).

**Personnel and Resources.** The command has approximately 45,000 military and civilian personnel serving in nine major locations and numerous smaller facilities, primarily in Hawaii, Alaska, Japan, Guam and South Korea. Approximately 300 fighter and attack aircraft are assigned to the command (37:2).

**Organization.** PACAF's major units are 5th Air Force, Yokota Air Base, Japan; 7th Air Force, Osan AB, South Korea; 11th Air Force, Elmendorf AFB, Alaska; and 13th Air Force, Andersen AFB, Guam. In Japan, U.S. air operations are controlled by 5th Air Force; for the Northern Pacific, by 11th Air Force; in South Korea, by 7th Air Force; and in the Southwest Pacific region, by 13th Air Force (37:2).

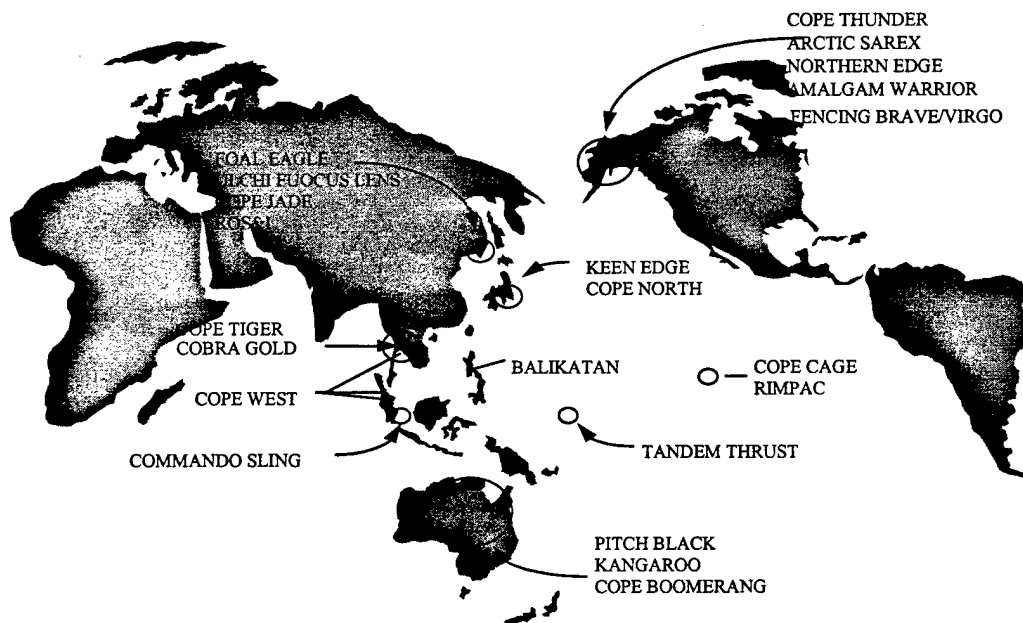
Major active duty units also include 3rd Wing, Elmendorf AFB; 8th Fighter Wing, Kunsan AB, South Korea; 15th Air Base Wing, Hickam AFB; 18th Wing, Kadena AB, Japan (Okinawa); 51st Wing, Osan AB; 343rd Wing, Eielson AFB, Alaska; 354th Fighter Wing, Misawa AB, Japan; 374th Airlift Wing, Yokota AB; and the 633rd Air Base Wing, Andersen AFB (PACAF) (37:2).

Three Air National Guard wings are also located in PACAF. These are the only three wings in the ANG that are physically located in a warfighting command. The Hawaii's 154<sup>th</sup> Wing consists of three squadrons (F-15A, KC-135R, and C-130H) all based on Hickam AFB. The Alaska Air National Guard possesses two wings, the 176<sup>th</sup> Wing and the 168<sup>th</sup>. The 176<sup>th</sup> Wing, located on Anchorage International Airport, consists of two squadrons, a C-130H airlift squadron and a rescue squadron composed of

both HC-130Hs and HH-60s. The 168<sup>th</sup> Air Refueling Wing is composed of one KC-135R squadron.

PACAF's air refueling assets are composed of three KC-135R squadrons, two of which are ANG units. The only active duty KC-135R squadron in PACAF is the 909 ARS (15 PAA) assigned to the 18 WG at Kadena. The two ANG squadrons are the 203 ARS (8 PAA) of the 154WG and the 168 ARS (8 PAA) of the 168 ARW. ANG KC-135R assets comprise slightly more than 50% of PACAF's KC-135 assets.

**PACAF/PACOM Exercises.** Alaskan-based fighters and tankers have participated in the exercises listed in Figure 5 on an almost annual basis since FY93. When 168<sup>th</sup> tankers are not flying in these exercises themselves, they are requested to support the Coronet movements to deliver the fighters to the overseas exercise. There is no warfighting theater that relies more on air refueling assets to simply deliver the fighters/AWACs to the fight than the Pacific Command.



**Figure 5. PACAF Exercises Involving 11th Air Force Participation (21:5)**

### **Present Day Situation**

In FY97, more than 75 tankers were deployed to Alaska at either Eielson or Elmendorf AFB to support air refueling requirements the 168<sup>th</sup> was not able to support. This includes KC-10s that supported small fighter movements or C-17/C-141 channel movements that KC-135Rs were more than capable of performing. If the air refueling requirements (to include the daily C-17 channel requirement) remain constant from FY97 levels, more than 93 tankers will be required in FY98 and beyond. In addition, when tensions increased with Iraq in November of 1997 and again in February 1998, six Air Reserve Component (ARC) KC-135s were deployed to Eielson to support bombers

deploying to the Middle East (1:2). Contingency deployments such as Phoenix Scorpion I and II will add to these numbers.

In FY97, the 168 ARW PERSTEMPO was 118 days as measured and reported by the 11<sup>th</sup> Air Force. The 168<sup>th</sup> has averaged just under the Air Force's upper goal of 120 days for the last two years. The chart below depicts the PERSTEMPO of the 11<sup>th</sup> Air Force Active Duty and ANG flying units as measured by 11 AF between May 1997 and April 1998.

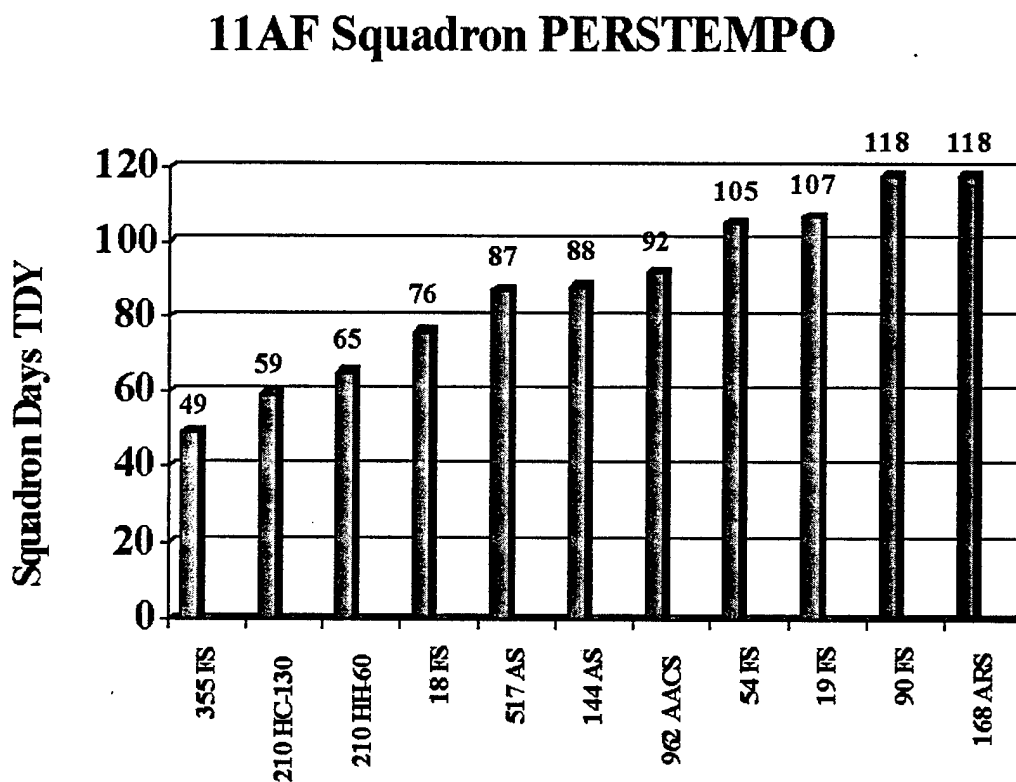


Figure 6. Personnel Tempo for 11 AF Flying Squadrons May 97 – Apr 98 (39)

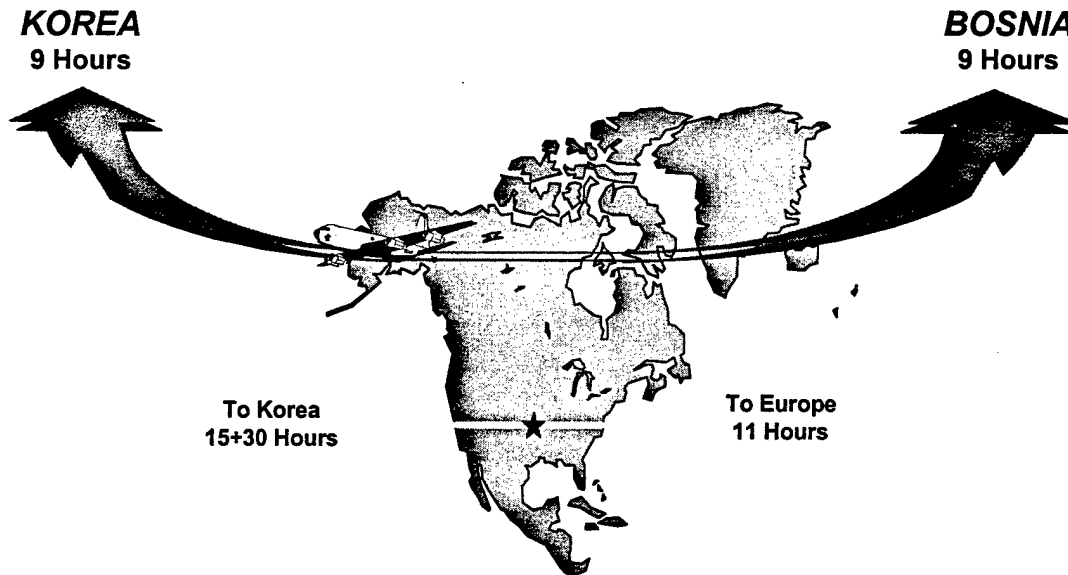


## **Potential Future Operations**

As the world's fastest growing economic region and the largest US trading partner, the Western Pacific is now and will remain vital to US national interests. Western Pacific countries account for 35% of US trade and consume 30% of US exports. Potential conflicts in this area would have a lasting negative impact on the world economy. United States military presence has been the foundation for regional stability and rapid economic growth...and will remain so for the foreseeable future (6:2).

On the contingency side, Alaska is uniquely centered in the middle of the "world" with regards to a major portion of the United States' political, economic, and military interests. Tokyo, London, and Miami are all about eight to nine hours flying time from Alaska. China's influence in and potential intimidation of Asian economic and military affairs will increase with each passing year due to its new found military and economic might. In the future, there could be significant political pressures in Japan, South Korea, or internally in the United States, to reduce the U.S. military presence in those countries. PACAF forces may be directed, as the United States Air Forces - Europe (USAFE) was in the early 1990s, to significantly reduce its foreign presence and return forces to the United States. Alaska could provide the home for a military force that could rapidly deploy to either the European or Asian theater. Forces from Alaska can reach Japan and Korea more rapidly than any West Coast force and can reach Europe at the same time or quicker than most forces stationed east of the Mississippi River. Air refueling assets stationed in Alaska would be critical to the success of any contingency deployment from

Alaska. Since the end of the Cold War, no significant air operation, whether it has been a humanitarian mission to Somalia or a combat deployment to stop Iraqi aggression, has been possible without USAF air refueling support.



**Figure 7. Geographic Reality of Eielson AFB (21:6)**

The composite wing concept (multiple airframes that are based and trained together as a single wing) was the innovative Air Force strategy in the early 1990s. Today, the Airborne Expeditionary Force (AEF) is the new Air Force strategy designed to deploy, as a single force, specific airframes from different bases to accomplish a specialized mission. AEF forces may or may not have trained together before they deploy on a contingency. In comparison to the Composite Wing and AEF concept, 11 AF assets are located in Alaska between two primary bases and train together on a daily basis in some of the nation's largest and newest tactical ranges. An increased tanker presence in Alaska could serve to reduce the cost of providing routine air refueling support in the North Pacific while at the same time increase the versatility of Alaskan-based Air Force/Air National Guard assets in a contingency.

### **III. DATA DESCRIPTION AND ANALYSIS**

#### **Methodology**

This paper used two AMC databases as the source of information to determine how many KC-135s and KC-10s deployed to Eielson and Elmendorf AFB in FY97. The first database was the Horseblanket, a Tanker Airlift Control Center (TACC) developed scheduling database designed to match air refueling requirements to the supporting tanker unit. The second database was the AMC History System (AHS), which is a centralized database that has recently began serving as the single repository for all actual mission data from the Global Decision Support System (GDSS). AHS provides the capability to run standard reports to general summary statistics or raw data. AHS's development is still on-going and has developed some "growing pains" (29:3).

The Horseblanket database used in this research was supplied by TACC and contained all FY97 USAF/ANG/AFRC air refueling missions in the database. The primary information fields used in this research were the REFUELING UNIT, RECEIVER, DATE TIME GROUP (DTG), A/R TRACK, PRIORITY, AND REMARKS. The database was sorted first by air refueling tracks managed by the 168 ARW, then by receiver type, refueling unit, and finally by DTG. The remarks block of the database was used to match Coronet mission numbers to the appropriate Coronet mission.

The AHS database information used in this research was supplied by the AMC Mission Reliability Office (AMC/MRO) and was the result of a search of the AHS database for all FY97 tanker missions that either departed from or arrived at either Elmendorf AFB or Eielson AFB, Alaska. The primary information fields used in this

research was the FIRST MISSION ID, MISSION ID, JULIAN DATE, ITINARY NUMBER, ACTUAL DEPARTURE TIME, ACTUAL DEPARTURE ICAO, ACTUAL ARRIVAL TIME, ACTUAL ARRIVAL ICAO, OPERATOR, and AIRCRAFT TYPE. This database was first analyzed by decoding the mission ID and determining mission categories (Coronets, Business Efforts, Reconnaissance support, etc.). The database was then sorted by the arrival International Civil Aviation Organization (ICAO) identifier/DTG and departure ICAO identifier/DTG, followed by a mission category sort.

Once the two databases were sorted to determine the categories of each air refueling mission, separate spreadsheets were developed for Reconnaissance support, Coronet moves, Phoenix Boom missions (airlift support before the C-17 channel missions became established) and an "other" category. The information from the two databases was then compiled together and sorted by DTG. The DTG for each mission, along with the remarks section of the Horseblanket database, was used to combine information where both databases were reporting the same mission (scheduled and actually flown). The end result was a list of tankers, both KC-135s and KC-10s, that were scheduled to fly on a 168 ARW managed air refueling track or actually departed or arrived at a base in Alaska on an air refueling mission.

An important assumption made was that not all actual air refueling missions flown out of Alaska were entered into an AMC command and control system such as GDSS or the Command and Control Information Processing System (C2IPS). As mentioned before, the 168 ARW does not have GDSS or C2IPS. Therefore, scheduled Horseblanket missions were included in this paper only on major Coronet movements that were known to have flown but were not reported in the AHS database. For example,

an AMC KC-135 (no unit specified) was scheduled in the Horseblanket to support an 11 AF fighter movement back to Alaska from the exercise Cope Taufan in Malaysia. The 168 ARW flew seven missions in support of Cope Taufan (reference appendix A), but none of them were in the AHS database. Therefore, the assumption was made that the one scheduled AMC tanker actually did fly as scheduled, but was also not reported in the AHS. This type of assumption was only used for 11 Coronet missions and 4 Business Efforts. The end result is the following figures are extremely conservative and probably underestimate the true cost of positioning/depositioning tankers in Alaska. The air refueling support required for each category was based on the following criteria:

1. C-17 Channel support: Assumes that the 168 ARW will continue to support the channel mission two days per week to cover the CONUS based KC-135s arriving and departing Elmendorf AFB. Also factored in is an assumption the 168<sup>th</sup> will deploy to Elmendorf twice each fiscal year to cover an entire week of C-17 channel missions. The 168<sup>th</sup> is scheduled to first do this twice in the last quarter of FY98 (24).
2. Busy Relays: Used only data that was reported in the AHS. Busy Relay missions were determined from the mission number associated with the data. Chances are very good that this number is under reported (24).
3. Pony Express is an unclassified name given to a classified mission. Due to the nature of the mission, this paper cannot analyze specific mission details. However, the primary issue regarding this tasking that can be discussed is these missions are tasked on a very short noticed basis (24 hours or less) and require tankers to deploy to Alaska (if the 168<sup>th</sup> cannot cover everything) for a planned minimum duration of five days. Release from the tasking before five days is completed is normal for this

operation, but occurs just as fast as the tasking arrives. The AHS reported the 92 WG from Fairchild AFB deployed to Eielson four times in FY97 with two KC-135s each time. However, only seven are listed because it appears that the 92 WG already had one tanker at Elmendorf supporting a busy relay when tasked by TACC to augment the 168<sup>th</sup> for a Pony Express. These numbers should be 100% accurate. The average number of Pony Express taskings per year is five, with four requiring KC-135 augmentation from another unit to the 168<sup>th</sup>. The 168<sup>th</sup> was tasked to support five Pony Express taskings in FY97, with the 92 ARW augmenting on four of those taskings. The employment data assumes that the 92 WG flew three sorties during each Pony Express deployment with a normal sortie duration of 6.0 hours. Each tanker sortie flown during a Pony Express mission also has a spare crew and aircraft that did not fly, or the spare crew and aircraft flew because the primary broke.

4. Coronet support data is the hardest to properly interpret. Again, very conservative Horseblanket and AHS numbers were used. There were 52 Coronet movements supported out of Alaska in FY97 (20), with all but three requiring KC-135 support. The Coronet analysis in this paper includes only 25 TDY KC-135s: 9 from the AHS, 11 from the Horseblanket, and 4 Business Efforts from the Horseblanket. Business Efforts are O&M funded tanker deployments designed to support both tanker and receiver training requirements. The 168<sup>th</sup> flew 22 Coronet West missions in FY97 (reference appendix A). The 17 KC-135s that deployed to Alaska for exercises in FY97 created the possibility they supported around 34 Coronets: one deploying to Alaska and one returning home. Assuming each of the 49 Coronet movements into and out of Alaska required two KC-135s, and by adding together the 25 TDY tankers,

the 22 Coronets flown by the 168<sup>th</sup>, and the possible 34 Coronets flown by exercise KC-135s, there remained at least 17 KC-135 Coronet sorties unaccounted for. No tankers scheduled to participate in an exercise in Alaska were included in the Coronet figures for this study since most should have been tasked to help deploy receiver participants. These assumptions understate the amount of tankers deployed to Alaska to support Coronet movements, but the amount of understatement cannot reasonably be quantified (due to the limits of the AHS). Tankers that appeared to be or were scheduled to be in Alaska at least three days prior a Coronet mission were also not included in the figures to prevent them from being counted twice. Chances are, some of the KC-135s included in this Coronet data were in Alaska to help support 11 AF fighter air refueling currency requirements for one or more of 11 AF's five fighter squadrons. One final note, KC-10s were not factored into this analysis except where noted because they usually fill a unique dual-role mission in airlift and air refueling for the deploying unit. Two KC-10 missions are included in this data because they were used to deploy only two fighters each to Hickam AFB for an air show and a third was included that supported a single B-52. None of the three KC-10s appeared to have originally been scheduled to arrive in Alaska for reasons other than to support the referenced taskings. In all three cases, KC-135Rs were more than capable of providing this support.

5. Other missions included in this table are missions that were identified by mission number in the AHS or in the remarks section of the Horseblanket. Examples include B-1, B-2, and B-52 bomber support, Presidential E-4 support, etc. This category is probably understated in this table.

6. Per Diem is based on the following assumptions. This paper assumed all crews were billeted on base, paid a rate of \$27.50 for proportional meals (an average of the seasonal rates), \$3.50 for the Outside of Continental United States (OCONUS) on-base incidental rate, and \$12 for billeting, for a total of \$43 per person per night. A KC-135 crew consists of a Pacer CRAG crew (three-person crew) with two crew chiefs and the KC-10 crew consists of four plus two crew chiefs. A Pacer CRAG crew underestimates the current crew costs, but represents a more accurate future picture once the entire KC-135 fleet is converted to the three-person Pacer CRAG cockpit configuration. The average channel support crew stayed for five days, plus two travel days; the Pony Express crews four days plus two travel days; the Busy Relay crews one day plus two travel days, the Coronet crews one day plus two travel days, and the "other crews" one day plus two travel days. Again, these are very conservative numbers and probably underestimate the true per diem cost.



**Table 1. Tanker Positioning and Depositioning Costs in Alaska**

Mission Type	Number of Tankers	Positioning Hours (round trip)	Positioning Cost to USAF * KC-135R = \$1,857 ** KC-10 = \$2,094	TDY Crew Days	Per Diem \$43 per night	Total Cost
C-17 Channel Support						
KC-135R	50	450	\$835,650	350	\$69,875	\$905,525
KC-10	NA	NA	0	0	0	0
Busy Relay						
KC-135R	2	15.2	\$28,226	6	\$1,075	\$29,301
Pony Express						
KC-135R	7***	53.2	\$98,791	42	\$9,460	\$108,251
Coronet Support						
KC-135R	25	257	\$477,249	75	\$13,438	\$490,687
KC-10	2	28	\$58,632	6	\$1,290	\$59,922
Other						
KC-135R	6	52.2	\$96,935	18	\$3,225	\$100,160
KC-10A	1	10	\$20,940	3	\$645	\$21,585
GRAND TOTAL	93	857	\$1,616,423	500	\$99,008	\$1,715,431

\* FY97 Constant Dollars

\*\* Assume all KC-135s were R models, which are cheaper than E models (see Table 2)

\*\*\* Eight 92WG KC-135Rs were used in FY97 to augment the 168<sup>th</sup> for Pony Express mission. However, one tanker was already at Elmendorf AFB supporting a Busy Relay when tasked to support a Pony Express, thus positioning hours have not been counted for that particular airframe, but per diem and employment hours have been.

**Table 2. Tanker Cost Breakout per Flying Hour**

MDS	Consum Supp GSD	Consum Supp SSD	Depot Maintenance	Depot Level Repair	Aviation Fuel	Total Flying Hour Cost
KC-135E	192	34	43	341	1361	1971
KC-135R	179	30	17	391	1240	1857
KC-10A	41	0	0	0	2053	2094

Flying Hour Consumable Supply (FHCS) costs measure expendable supplies directly associated with the repair of flying mission assets at the base level. The General Support (GSD) consumable items are managed by the Defense Logistics Agency (DLA), other services, or purchased through local purchase authority. The Systems Support (SSD) consumable items are managed by the Air Force.

Depot maintenance costs per flying hour are those costs associated with the repair effort during engine overhaul. Depot level repair costs represent both repair and surcharge costs associated with aircraft and engine component equipment repair on items sent to a depot as a “not repairable this station” (NRTS) action.

The last area that required researching was the number of hours that tankers deployed to Alaska were employed. The C-17 Channel support is based on the current TDY tankers performance statistics (five days per week, 50 weeks per year, with a 66% show rate for a total of 165 days or sorties) (19).

**Table 3. FY97 and Project TDY Tanker Employment Data**

Mission Type	Number of sorties	Average Sortie Length*	Number of flying hours employed in AK
C-17 Channel Support*			
KC-135R – 50%	125	4.5*	562
KC-135R – 66%	165	4.5*	742
KC-135R – 75%	188	4.5*	846
Busy Relay			
KC-135R	2	6.0	12
Pony Express			
KC-135R	12	6.0	72
Coronet Support			
KC-135R	59	4.8	283
KC-10A**	2	0	0
Other			
KC-135R	5	3.8	19
KC-10A	1	3.0	3
<b>GRAND TOTAL</b>	<b>244</b>	<b>4.6</b>	<b>1131 at 66% C-17 Channel</b>

\* The average KC-135R mission duration for a C-17 Channel mission on AR 505 is 4.5 hours from Elmendorf AFB, but is only 3.5 hours for an Eielson AFB based KC-135R.

\*\* Two Coronet KC-10s were not included in this employment table because the flying hours were counted in the positioning/depositioning Table 1 when they moved the fighters during their depositioning phase to Hickam AFB.

The methodology used for table 3 is:

- 1) For the C-17 Channel mission, the average mission duration of 4.5 hours from Elmendorf on A/R track 505 was used.
- 2) The average Busy Relay mission duration was 6.0 hours.
- 3) The average Pony Express mission was 6.0 hours. What is not noted is that for every mission flown, there was one ground spare aircraft and crew. Thus, a total of two primary KC-135s and two ground spares plus four crews are committed each day of a Pony Express tasking.
- 4) Coronet missions were broken out flying hour wise per AR track:
  - AR Track 720SW is .7 hours one way from either Eielson or Elmendorf, plus .8 hours on track for a total mission duration of 2.2 hours.
  - AR Track 719 is .5 hours from Eielson and 1.5 hours from Elmendorf. An average of 1.0 hours one way time was used plus .5 hours on track time for a total mission duration of 2.5 hours.
  - A mission duration of 4.5 hours was used for force extenders with no AR track designated.
- 5) Other missions, such as B-1B and B-52 support was based on the following:
  - AR 505W used the same track time as the C-17 channel missions.
  - AR 507E/W is 1.2 hours from Eielson and 1.0 hours from Elmendorf. An average of 1.1 hours one way was used plus .8 hours of track time for a total mission duration time of 3.0 hours.

## Results Analysis

As demonstrated in the previous section, an increase in ANG KC-135Rs stationed at Eielson could help reduce the operations and personnel tempos of the active duty's two largest KC-135 wings, the 92 ARW at Fairchild AFB, WA and 319 ARW at Grand Forks AFB, ND. The air refueling requirements that TDY tankers supported in Alaska were evenly spaced out for 11 of the 12 months of the fiscal year (FY97 for this study), so the season or timeframe for various support categories was not a factor in this analysis. Since this paper strives to be conservative and not overestimate the number of tankers deployed to Alaska, this paper also assumed all costs associated with the TDY tankers identified can be saved with additional tankers assigned in some manner to Eielson AFB. Reality dictates that, although increasing the tanker PAA of a base such as Kadena and Mildenhall will greatly reduce the TDY requirements, the TDY tanker requirement cannot be completely eliminated due to the unique nature of certain air refueling requirements for events such as contingencies, exercises or extremely large movements of receiver aircraft. This paper assumed that the very small remaining TDY requirement for KC-135s would be the same as the amount of TDY tankers that this paper failed to identify.

The per diem calculations assumed all TDY tanker personnel were billeted on base. Again, this underestimates the true cost of per diem.

## **Summary of Results**

Strategy 4 of AMC's Strategic Plan is to increase efficiency and effectiveness. Goal 4a specifically states "the elimination of non-value added activities has become a strategic imperative with the stress created by our high OPS TEMPO." Analysis of the FY97 and the current FY98 air refueling data clearly demonstrates the need to increase the number of KC-135Rs based in Alaska. The USAF will spend more than 850 flying hours to position and deposition tankers in Alaska in FY98. While deployed to Alaska, these tankers will be employed for only 1,131 hours. For every one hour a tanker is employed in Alaska, it will spend another  $\frac{3}{4}$  of an hour to position itself in Alaska and reposition itself back home. The end result is 500 aircrew days (more than 2500 man days) will be spent TDY to Alaska in FY98. Although these numbers are considered small in terms of the air refueling support required on the East Coast of the United States, in Europe, or in the Middle East, they nonetheless represent an inefficient utilization of flying hours and human resources. The next section of this paper will review four alternatives that could increase the efficiency and reliability of air refueling support in the North Pacific Region.

#### **IV. ALTERNATIVES AND COST BENEFIT ANALYSIS**

##### **AMC KC-135 Issues**

In 1993, when AMC began tracking TDY rates, the KC-135 overshadowed other AMC weapon systems with the highest TDY rate. In some cases, the active duty KC-135 force had twice as many days TDY as other major weapon systems, exceeding the Air Force 120 day TDY goal. From the average high of 123 days TDY in FY93, reduction efforts successfully lowered the TDY rate to an average of 112 in FY94, 109 in FY95, 101 in FY96 (16), and 91 in FY97 (36:1; 15). AMC is continuing its short-term efforts to lower and maintain the active duty KC-135 TDY rate in the low 90s in part by reducing the number of non-productive Business Efforts and by increasing the ARC participation on CONUS TDYs and Tanker Task Forces. Long-term efforts include staffing the impact of overseas force structure transfers and reducing the number of underutilized KC-135s on overseas missions (16).

This section of the paper will analyze four alternative force structure proposals that increase the number of KC-135s available to support air refueling requirements in the North Pacific Region. Each proposal was designed to address the four short and long term AMC efforts mentioned above in order to decrease the active duty KC-135 TDY rate. For example, increasing the number of ANG KC-135s at Eielson AFB to cover the daily C-17 channel mission will increase the ANG participation in supporting the air refueling requirements in the North Pacific and eliminate a non-productive Business Effort where the receiver has been canceling at a 34% rate. The 319 ARW deployed to

Elmendorf AFB for a week in FY98 and did not fly once in support of the C-17 before returning to Grand Folks AFB (27). The impact of a receiver cancellation on a 168<sup>th</sup> aircrew and maintenance personnel is minimal since they are permanently based at Eielson.

### **Issues Regarding Air Refueling Operations in the North Pacific**

**Command and Control Issues.** The 168<sup>th</sup> has requested from both the ANG and AMC the standard AMC command and control systems such as C2IPS and GDSS. AMC's response has been that the ANG will provide the systems and the ANG's response is that if AMC really required the 168<sup>th</sup> to have those systems, AMC will provide them. As a result, the only true, reliable communication the 168<sup>th</sup> has with AMC is via the telephone and fax machine (24). Since the command and control systems support between TACC and the 168<sup>th</sup> is virtually non-existent, the 168<sup>th</sup> will deploy to Elmendorf AFB twice in the fourth quarter of FY98 to support the five-day C-17 channel commitment that a TDY KC-135 normally supports (24). Unlike Eielson, the Elmendorf command post has the AMC command and control systems in place with trained personnel to support AMC taskings.

If the 168<sup>th</sup> were to receive the AMC unique command and control systems, additional manpower positions would be required to monitor these systems for changes. Contrary to popular belief, the new automated systems do not save as much time and manpower resources as most people believe. They actually require greater manpower to maintain and monitor the systems. What these systems will do is push a much greater volume of information in almost near real time.

**Maintenance Issues.** The 168<sup>th</sup> maintenance force is a technician force, manned and funded to work one eight-hour shift for five days per week. AMC had initially planned to deploy the KC-135s supporting the C-17 channel mission to Eielson AFB and requested the 168<sup>th</sup> to support those tankers. However, AMC offered no additional maintenance personnel for the 168<sup>th</sup>. Without any additional maintenance bodies, the 168<sup>th</sup> would not accept the workload of another tanker on the ramp to support the C-17 channel mission (24). The 168<sup>th</sup>, like the rest of the active and ARC KC-135 community, is feeling the negative results of a high OPSTEMPO and PERSTEMPO. In addition to a high OPSTEMPO, the 168<sup>th</sup> has felt the sting of accepting additional taskings without additional manning positions or other resource compensation. Examples include accepting Coronet mission planning and fighter delivery planning responsibilities, Pony Express support, and some Cope Thunder commitments without additional manpower authorizations. The aircrews performing these planning functions are the same aircrews tasked to fly these missions. The end result of supporting one of the highest PERSTEMPOs in the 11<sup>th</sup> Air Force is the overworking of both the full and part time members of the 168<sup>th</sup>. This paper will show that the costs of modest increases in the maintenance full-timer strength of the 168<sup>th</sup> will be more than offset by decreases in other areas.



## Identifying the Number of KC-135Rs required in Alaska

The USAF will annually spend more than 850 flying hours by positioning and depositioning tankers in Alaska to have them employed for about 1,130 hours (these numbers are based on the previously stated assumptions). The deployed tankers can be broken into two main categories. The first is tankers that are deployed for a specific mission, such as a Coronet Movement or a Busy Relay. The second category is tankers that are deployed to cover air refueling requirements for a particular airframe over a specified timeframe, such as Pony Express and C-17 Channel support missions.

Table 4 depicts the number of KC-135s at Eielson required to support the 1,131 hours that TDY tankers are employed in Alaska.

**Table 4. KC-135Rs Required to Support the Current Tanker TDY Commitments**

<b>Mission</b>	<b>Hours</b>	<b>Number required</b>	<b>FHs provided*</b>
C-17 Channel 50%	562	2	606
C-17 Channel 66%	742	3	909
C-17 Channel 75%	846	3	909
Busy Relay	12	-	--
Pony Express	72	-	--
Coronet Support	283	1	303
Other	22	1	--
<b>TOTAL</b>			
C-17 = 50%	951	4	1208
C-17 = 66%	1131	4 + 1(BAI)	1208
C-17 = 75%	1235	5	1510

\* The number of tankers required are based on the USAF average allocation of 302 flying hours per active duty KC-135 PAA.

If the USAF would increase the PAA of the 168<sup>th</sup> by at least four plus provide another BAI aircraft and transfer the associated hours (1,208 hours), the 168<sup>th</sup> should be able to cover the 1,131 employment flying hours the TDY tankers flew. This assumes the C-17 mission will continue to fly at its current 66% rate. Assuming that as more C-17s come off the production line, the overtasking problem will be reduced and the mission show rate would increase to 75%, the total number of employment hours increases to 1,235 flying hours. This would require, at a minimum, an increase of five PAA for a 13 PAA squadron to cover *only* the North Pacific Region air refueling requirements. Taking this logic one step further, if the 168<sup>th</sup> Air Refueling Squadron was increased to a 14, 15, or 16 PAA squadron, the additional 300 - 900 flying hours could be used to support other TDY Pacific air refueling requirements. For example, an Eielson based tanker is about 2 hours and 45 minutes closer to Japan and Korea (5.5 hours round trip) than the nearest CONUS AMC KC-135 base (Fairchild AFB). These TDYs in the Pacific Theater would further increase the efficiency of air refueling operations in the Pacific and reduce the amount of short notice taskings and days away from home for AMC CONUS based KC-135 and some KC-10 crews.

Table 5 depicts the airframes that would be available for tasking and the primary mission of each. AMC attempts to commit no more than 80% of its active duty KC-135R fleet. The remaining 20% are "maintenance withholds" based on the logistics community's estimate for reliability and maintainability of the KC-135 fleet (33:5). The 168<sup>th</sup> at times is forced to commit more than 80% of its available fleet (10), creating problems when maintenance or some other factor prevents a scheduled mission from launching as scheduled.

**Table 5. Number of KC-135Rs Available for Mission Taskings per PAA Increase to the 168 ARW**

<b>PAA</b>	<b>PDM</b>	<b>Phase</b>	<b>TDY</b>	<b>North Pacific Support (PACAF, 11AF, AMC, and 168<sup>th</sup> training)</b>	<b>ANR Alert</b>	<b>20% spare</b>
8	1	1	1	3	1	1
10	1	1	1	4	1	2
12	2	1	2	4	1	2
13	2	2	2	4	1	2
14	2	2	2	4	1	3
15	2	2	2	5	1	3
16	2	2	2 or 3	6 or 5	1	3

The average active duty KC-135R unit was allocated 302 flying hours per PAA in FY97 (3). The 168 ARW was allocated 364 hours per PAA in FY97 and 362 in FY98 (23). Flying hours per PAA is based on the training requirements of each unit and the average sortie duration of the unit's missions. Due to the vast size of Alaska and the distance to the air refueling tracks used to support airlift, reconnaissance, and fighter movement missions, the 168<sup>th</sup> is assigned a higher than average number of flying hours per PAA. However, as the PAA of a unit increases, the number of flying hours required to support training decreases. This occurs as the ratio of staff officers on flying status is decreased to the number of flying squadron aircrew members. Table 6 was used to determine the number of flying hours required if the PAA of the 168<sup>th</sup> was increased and the associated annual savings. The savings was calculated by reducing the number of flying hours for the entire squadron as the PAA was incrementally raised from an eight PAA squadron with 362 flying hours per PAA. The assumption made was that the airframes would come from the active duty fleet, so any hours above the active duty

average of 302 was then added back in as a cost. Reference Appendix C for the methodology used to calculate the number of flying hours per PAA for the 168 ARW.

**Table 6. Cost of Flying Hours Saved by Increasing the PAA of the 168 ARW**

<b>ANG PAA</b>	<b>ANG FH/PAA</b>	<b>168ARW FH/PAA</b>	<b>168<sup>th</sup> FHs Saved*</b>	<b>Cost of FHs Saved*</b>
8	325	362	-	-
10	298	332	181	\$335,631
12	288	320	255	\$472,695
14	280	312	342	\$634,580
16	273	304	447	\$829,559
18	267	-	-	-
20	261	-	-	-

\* Data rounded to nearest whole number. Refer to Appendix C.

### **Cost-Oriented Resource Estimating (CORE) Model**

CORE is designed to provide a cost-estimating model that MAJCOMs may use to develop aircraft squadron annual Operating and Support (O&S) estimates. The model is a variable-cost model, and as such, does not necessarily correspond to programming and budgeting costs that consider total cost. However, many of the cost elements from the model are compatible with approved Planning, Programming, and Budgeting System (PPBS) costs, and can be used to derive the impact of alternate aircraft choices (9:6).

The first three alternatives involving a force structure change assumes one active duty KC-135R squadron would be inactivated. The active manpower authorizations attached to the each PAA option in tables 7, 12, and 18 would be eliminated from the Active Air Force, except where noted in Alternative 1. The manpower authorizations attached to the remaining four or six KC-135s would transfer with the airframes to robust another active duty KC-135 squadron from 12 to 15 PAA, form another RAU at another

ARC location, etc. Chances are, not all of the manpower authorizations attached to the remaining airframes would be required at the gaining active duty KC-135 organization due to reduced staff (overhead) costs, creating further savings. Each of the active duty PAA options assume each six, eight, and twelve PAA flight/squadron is independent. The maintenance manpower savings represented in this paper result from converting this "typical" *independent* active duty squadron to a flight or squadron *dependent* on a specific ANG KC-135 wing that would provide the maintenance and BOS functions. Unlike the Active Air Force, an ANG organization is typically only authorized the number of full-timers required to support a routine daily peacetime OPSTEMPO. The extra ANG personnel required to support a contingency or combat OPSTEMPO comes from the part-timers. As a result, significant maintenance manpower savings result when maintenance functions are transferred from the active Air Force to the ANG. The additional manpower costs of increasing active duty KC-135 squadrons from 12 to 15 PAA with the left over inactivated squadron's airframes and personnel was not researched in this paper.

The manpower numbers for an average active duty 12 PAA KC-135R squadron were obtained from Attachment 42 of AFI 65-503 (OPR: HQ USAF/PEP). HQ USAF/PEP (Maj Johnson, DSN 227-4781) provided the active duty manpower numbers associated with a six and eight PAA active duty KC-135 flight/squadron. Both PAA options included 25 enlisted security forces assigned to each option. Unfortunately, the KC-135 manpower expert at USAF/PEP was not available to perform the necessary research to determine more accurate active duty manpower numbers associated with an independent and dependent six and eight PAA flight/squadron. The active duty

manpower numbers that each alternative compares itself to represents a “typical” independent active duty KC-135 squadron and probably misrepresents the true manpower costs associated with a dependent squadron to some extent. However, more accurate manpower numbers and the associated costs can only be determined once an active duty squadron has been identified. This paper’s goal is to present potential estimated savings through various force structure changes and stops short of identifying actual units. To help counter potentially high manpower figures associated with the active duty six and eight PAA independent flights/squadrons, this paper did not include the 25 enlisted security force manpower authorizations that would normally be associated with both options.

The ANG manpower numbers were derived from AFI 65-503 and inputs from the 168 ARW. Unlike the active duty manpower numbers for a “typical” unit, these numbers are tailored to the 168 ARW and represent a more accurate manpower cost. All other factors used in the CORE model were obtained from either AFI 65-503, or if outdated, from the OPR listed in AFI 65-503, or as stated in the alternative (such as flying hours or PAA data).

### **Systematic Approach to Better Long-Range Estimating (SABLE) Model**

The SABLE model is also designed to estimate aircraft peacetime O&S costs for typical Air Force flying units. The program data loaded in the model (typical squadron size and flying hours per aircraft) is drawn from Air Force programming documents and represents a typical squadron.

This paper used the same unit specific programming numbers for both the CORE and SABLE Models. The CORE model data is listed in a table for each force structure proposal. The SABLE model was used to validate the CORE model data presented in this paper.

### **Notes on Force Structure and the Air National Guard (ANG)**

A six step process is suggested by the ANG 1998 Long Range Plan for an objective analysis to present criteria and allow decision-makers to quickly and objectively analyze the capabilities of the states or units to accept additional tasking, to convert to a different mission, or in the event of reduction or divestiture, to identify the units least capable of performing in their current mission (30:21). This paper will utilize the following six step process for an objective analysis for each alternate proposal:

1. Identify the essential requirements of the existing, expanded, or new mission or force structure.
2. Assess the unit's/state's capability to accommodate existing or new requirements.
3. Identify the shortfall between existing and required capability.
4. Determine additional resources required to support the new or expanded force structure/mission (manpower, facilities, special capabilities, etc.) or the potential resource savings associated with a reduction or divestiture.
5. Assess the unit's/state's capabilities or limitations using the evaluation matrix.
6. Based on objective analysis, develop for consideration by the decision-maker, a prioritized list of locations capable of assuming new or expanded force

structure, or marginal performers in current weapon system/mission as candidates for reduction or divestiture.

### **Alternative 1 – Reverse Associate Unit**

A reverse associate unit is an active duty squadron or smaller organization assigned to an ARC flying wing. In this case, an active duty Air Refueling Squadron (ARS) consisting of aircrew and the associated operations support personnel would be assigned as an associate unit to the 168 ARW. The ARS and airframes would be active duty, but the maintenance function and manpower authorizations would transfer to the ANG. This concept utilizes the strengths of both organizations. The active duty flying squadron (or a flight attached to the local ANG Air Refueling Squadron) would provide the availability and reliability of aircrews that AMC and PACAF desire. The ANG technician force provides the experienced maintenance support that can perform the same job tasks with fewer full-time manpower authorizations. The average active duty crew chief is usually an Airman First Class or a Senior Airman versus a Technical or Master Sergeant in the ANG. ANG technician crew chiefs are usually assigned to the same aircraft for their duration as a crew chief or the life of the airframe in the unit, enabling them to troubleshoot “their” aircraft in a more efficient manner.

**Cost-Benefit Analysis using the CORE Model.** The following assumptions were made in using the CORE/SABLE models to analyze the cost differences between keeping six or eight KC-135s in a standard 12 PAA active duty squadron and assigning them as a RAU to an ANG wing.



- 1) The crew ratio will remain the same for the reverse associate unit as for the active duty unit; both at 1.36.
- 2) Crew size is based on a Pacer CRAG crew of three (two pilots and one boom operator).
- 3) As noted previously, 312 flying hours will be assigned per PAA for a six PAA flight and 304 hours for an eight PAA flight attached to the 168 ARW. The average active duty flying hours allocated per PAA is 302.
- 4) One active duty KC-135R squadron would be inactivated. The maintenance and Base Operating Support (BOS) manpower authorizations attached to the each RAU option in Table 7 would be eliminated from the Active Air Force. The manpower authorizations attached to the remaining four or six KC-135s would transfer with the airframes to robust another active duty KC-135 squadron from 12 to 15 PAA, form another RAU at another ARC location, etc.
- 5) No additional security forces would be required at Eielson AFB. The 168 ARW was recently assigned 25 additional Unit Manning Document (UMD) security manpower billets.
- 6) The 168<sup>th</sup> and Eielson AFB will require no additional BOS manpower authorizations to support either a six or eight PAA reverse associate unit.

Table 7 lists the personnel numbers that were provided by HQ USAF/PEP. All of the crew and squadron staff manpower numbers identified in each PAA option would be assigned to the RAU and attached to the 168 ARW while the maintenance and BOS personnel could be eliminated. The remaining personnel associated with the KC-135s

would be reassigned to the existing active duty squadron(s) where the airframes would be assigned.

**Table 7. Active Duty KC-135 Personnel Positions Per Various Squadron Sizes**

Sq. Size	Aircrew Personnel		Maintenance Personnel			Squadron Staff			Total Primary Program Element			Base Operating Support			Grand Totals		
	OFF	ENL	OFF	ENL	CIV	OFF	ENL	CIV	OFF	ENL	CIV	OFF	ENL	CIV	OFF	ENL	CIV
12	49	16	0	204	0	3	18	0	38	238	0	0	21	7	38	259	7
6	18	9	0	152	0	3	10	0	21	196	0	0	13	4	21	209	4
8	22	11	0	203	0	3	10	0	25	224	0	0	16	5	25	240	5

Based on AFI 65-503 and conversations with various 168 ARW maintenance officers, the 168<sup>th</sup> would require the estimated manpower authorizations in Table 8.

**Table 8. Additional Manpower Positions Required by 168 ARW**

Sq. Size	Operations Group				Logistics Group			Grand Totals					
	AGR		Drill		Tech.	Drill		AGR		Tech.		Dill	
PAA	OFF	ENL	OFF	ENL	TECH	OFF	ENL	OFF	ENL	TECH	OFF	ENL	
6	0	0	0	0	42	0	126	0	0	42	0	126	
8	0	0	0	0	50	0	150	0	0	50	0	150	

**Table 9. Reverse Associate Unit CORE Model Results**

	<b>Active Duty 6 PAA</b>	<b>Active Duty 8 PAA</b>	<b>RAU 6 PAA</b>	<b>RAU 8 PAA</b>
<b>OPERATIONS</b>				
Aircrew	\$1,585,325	\$2,113,766	\$1,585,325	\$2,113,766
Organizational Maint.				
Military Pay	\$5,310,272	\$7,092,008	\$0	\$0
Technician Pay	\$0	\$0	\$1,867,236	\$2,222,900
Drill Officer Pay	\$0	\$0	\$0	\$0
Drill Enlisted Pay	\$0	\$0	\$679,014	\$808,350
Unit Staff				
Military Pay	\$588,376	\$588,376	\$588,376	\$588,376
Security (Mil. Pay)	\$0	\$0	\$0	\$0
<b>UNIT LEVEL CONSUMPTION</b>	\$3,364,884	\$4,486,512	\$3,476,304	\$4,516,224
<b>DEPOT LEVEL MAINTENANCE</b>	\$1,175,166	\$1,566,888	\$1,176,186	\$1,567,160
<b>INDIRECT SUPPORT</b>				
Non-pay/Material	\$625,600	\$788,800	\$108,800	\$125,120
Pilot Training	\$436,615	\$582,153	\$436,615	\$582,153
Boom Training	\$44,602	\$59,469	\$46,560	\$62,080
Non-Aircrew Training				
Officer	\$8,721	\$6,038	\$6,477	\$4,484
Enlisted	\$292,673	\$370,314	\$16,490	\$15,395
PCS				
Officers	\$296,919	\$353,475	\$296,919	\$353,475
Enlisted	\$1,737,417	\$2,202,945	\$157,947	\$174,573
BOS				
Military	\$454,168	\$558,976	\$0	\$0
<b>GRAND TOTALS</b>	<b>\$15,920,737</b>	<b>\$20,769,721</b>	<b>\$10,442,248</b>	<b>\$13,134,056</b>

**The ANG Six Step Process.** All operations criteria in the ANG six step process fall under the excellent criteria. The required equipment is on hand, but will need to be transferred to Eielson AFB from an active duty location. Since the USAF PAA inventory is not changing, no equipment will need to be purchased. However, a one time cost of transferring the equipment and aircraft will occur, with the KC-135s remaining in the active Air Force inventory and the associated maintenance equipment transferring to the 168th. The 168<sup>th</sup> has been a textbook example of the total force concept. As the only air refueling unit in the North Pacific, the 168<sup>th</sup> is, in PACAF's words, one of the three tanker base pillars in the Pacific (25:1). Clearly, the 168<sup>th</sup> provides a service from its home station that is essential for moving equipment across the North Pacific Theater.

The 168<sup>th</sup>'s maintenance hangar was designed to have a second maintenance bay added to the original building for a cost of between \$5 – \$6 million (34). Although the former SAC hangar is capable of housing three KC-135s at once, as a historical building from the World War II and Lend Lease Act era, there are some limitations of what can be done with it. It is also very energy inefficient. The USAF spent \$203,000 in Operations and Maintenance (O&M) expense for the former SAC hangar in FY97. If a second maintenance bay was added to the existing 168 ARW hangar, it would cost around \$35,000 per year to operate and maintain (35). A third option for additional 168 ARW covered hangar space is to build another independent 28,000 square foot hangar for \$7.8 million (34) that would cost around \$45,000 per year to operate and maintain (35). For a RAU, is it probably in the best interest of the USAF to fund and build the second maintenance bay addition to the current 168 ARW hangar. If the USAF decides to

withdraw the airframes and the RAU from Eielson AFB in the future, the second maintenance bay would remain a valuable asset to support the existing ANG unit and any required contingency tanker task. The addition of a second bay would also allow for a KC-10 to be completely covered inside the two-bay hangar.

The unique location of Eielson AFB dictates that it should be included in any NORAD, STRATCOM, and PACAF war plans. The 168<sup>th</sup> is probably the only ANG wing located in the theater and on the base that it is designed fly out of to support war operations. The RAU active duty KC-135 aircrews should enjoy a lower OPSTEMPO at Eielson supporting the North Pacific Theater and PACAF air refueling requirements while at the same time greatly reducing the Pacific Theater OPSTEMPO of CONUS tankers.

The demographics of Alaska should support the additional manpower requirements. Recruiting and filling the Civil Technician positions should not be a problem. There are usually always enough part-timers to apply for full-time positions. The additional part-timer positions will pose a tougher challenge. However, unlike most CONUS ANG units and the USAF that have to compete with the strong national economy, the local economy does not appear to be much of a factor in recruiting in Alaska. The Recruiting Office Supervisor of the 168 ARW reports, if given the proper recruiting resources, he would be able to recruit another 150 part-time positions in a year and a half (32). The 168 ARW, as of March 1998, was manned at 92% of its authorized billets and 92% of its critical AFSC positions. However, on the maintenance side, the Aircraft Generation Squadron (AGS) was manned at 106% authorized and 105% critical strength, and the Maintenance Squadron (MXS) was manned at 97% authorized and 98%

critical strength (32). The primary reason the 168 ARW as a wing is below 95% is due to the very recent addition of 25 security force billets to the Unit Manpower Document (UMD) that the recruiters have not had time to fill (32). The 168 ARW tends to have more of a problem with retention than recruiting due to the more mobile nature of Alaskan residents, but this is countered by recruiting new members with prior military experience. Eighty to eighty-five percent of new members joining the 168 ARW have prior military experience (32). Historically, given sufficient recruiting resources, Alaskan demographics has supported manpower increases in the 168 ARW as it has grown from a squadron in 1986 to its current wing status.

The political factors of community willingness and public acceptance around Eielson AFB are probably the best within the ANG. The Alaska ANG enjoys strong local, state, and national support from its elected officials. Eielson AFB is located 26 miles Southeast from Fairbanks, so noise and encroachment is not a factor. In fact, the KC-135R is probably the quietest airplane on Eielson AFB, next to the A-10.

**Table 10. ANG Six Step Checklist for a Reverse Associate Unit**

FACTORS	CRITERIA			
	EXCELLENT	GOOD	MARGINAL	POOR
<b>OPERATIONAL CAPABILITY</b>				
Unit Equipment	Modern, compatible with Tasking & Activities <b>X</b>	Earlier Generation, but Compatible	Earlier Generation, Some Incompatibility	Obsolete, Incompatible
Equipment on Hand	90 – 100% <b>X</b>	75 – 90%	--	Less than 75%
Unit Performance	Meets/Exceeds Established Standards <b>X</b>	--	Marginal	Unsatisfactory
Training Limitations –	No Operational / Training Constraints <b>X</b>	Some Limitations, but Alternatives Avail.	Can Accomplish Basic Proficiency Training	No Tactical Realism; No local alt. Avail.
Total Force Contribution and Relevancy	Essential <b>X</b>	Augmenting	Useful	Low Priority
<b>FACILITIES</b>				
Real Estate Availability	Adequate; Good Growth Capability <b>X</b>	Adequate; Limited Growth Capability	Marginal/Minor Land Acquisition Required	Inadequate; Major Land Acquisition Require / Not Possible
Construction Required	0 - \$5Million <b>X</b>	\$5M - \$10M <b>X</b>	\$10M - \$20M	Over \$20M
Maintenance Repair	0 - \$1Million <b>X</b>	\$1M - \$3M	\$3M - \$6M	Over \$6M
<b>MISSION TASKING</b>				
Wartime Tasked	90 – 100% <b>X</b>	75 – 90%	50 – 75%	Less than 50%
Ability to Support Peacetime OPTEMPO	Able to Support 75 – 100% of AD TDY requirement <b>X</b>	Able to support 50-75% of AD TDY Requirement	Able to Support 25 – 50% of AD TDY Requirement	Able to Support 0 – 25% of AD TDY Requirement
Cross-Mission Impact	Provides Essential Support to Other Units/Missions <b>X</b>	--	--	Provides Little or No Support to Other Units Missions

**Table 10. ANG Six Step Checklist for a Reverse Associate Unit (Continued)**

<b>DEMOGRAPHICS</b>				
Available Skill Pool	At Least 90% of Required	At least 75%, but Favorable Trends	At least 75%, but Unfavorable Trends	Support less than 75% of Needed Skill Positions
Manning	<b>X</b> 95% or more	90 – 95%	85-90%	Less than 85% likely to meet requirements
Retention	<b>X</b> At Least 90% of Critical Skills <b>X</b>	← ← <b>X</b> 85-90% of Critical Skills	80 – 85% of Critical Skills	Unable to retain 80% of Critical Skills
<b>POLITICAL ENVIRONMENT</b>				
Community Willingness to Accommodate Change	Committed to Retaining Unit			Actively Seeking to Convert ANG Facilities to Other Uses
Public Acceptance	<b>X</b> Active Local and State Support <b>X</b>	Neutral Local; Active State Support	Neutral Local and State Support	Negative Local and State Support
<b>ENVIRONMENTAL FACTORS</b>				
Encroachment	None; None Projected	Some; Slow Development	Moderate: Likely to Constrain Operations in Next Five Years	Already Constrains Operationally; Trending Worse
Noise	<b>X</b> Not Sensitive; No Operational Constraints	Some Sensitivity; Minor Operational Constraints	Moderate Sensitivity: Significant Operational Constraints	Strong Sensitivity; Major Operational Constraints
Environmental Assessment	<b>X</b> Little or no impact anticipated <b>X</b>	Environmental Input Statement (EIS) with only Minor Findings	EIS with Major Findings	EIS with Significant Findings

**Benefits.**

- 1) AMC/PACAF will have more control over the additional airframes and aircrews since they will be active duty.
- 2) Short notice tasking deployments from Eielson will be easier to accomplish.
- 3) AMC will not have to deploy 92 WG crews to Eielson for no-notice Pony Express taskings.



- 4) Additional tankers at Eielson should be able to support any Pacific AEF package deploying out of 11<sup>th</sup> Air Force without augmentation.
- 5) Decrease deployments for active duty crews in the Pacific. The end result is a more efficient use of airframes and aircrews within the North Pacific Region and in the PACAF Theater.
- 6) Increased technician positions at Eielson should be able to provide 24-hour maintenance support. Since the air refueling requirements covered in this paper can all be supported from Eielson AFB, an ANG technician maintenance force that is much smaller than a "typical" active duty maintenance force can support the additional airframes identified in this paper.
- 7) The active duty operations staff personnel would allow for manning of AMC unique Command and Control systems.
- 8) The annual savings of an estimated \$6.2 - \$8.6 million in total costs would pay in one year for the additional maintenance bay to the 168<sup>th</sup> hangar.
- 9) The total PAA inventory of the active duty Air Force will not change since the RAU airframes attached to the 168<sup>th</sup> will remain active duty.

**Drawbacks.**

- 1) An office location for the RAU operations flight assigned to the 168<sup>th</sup> *may* have to be found/refurbished.
- 2) A MOA must be worked out with the host unit at Eielson AFB for additional use of the old SAC hangar if the second maintenance bay addition is not funded or if another independent hangar is not built.

3) An addition to the existing 168 ARW supply building would probably be required, but only an addition.

4) Technician crew chiefs would require some additional mandays to support TDYs.

However, the cost of this would be minimal compared to the on-station maintenance savings.

**Summary of Savings and Costs.** Table 11 represents the various savings and cost factors identified with this proposal.

**Table 11. Summary of Savings and Costs for a Reverse Associate Unit**

<b>Cost/Savings Category</b>	<b>Annual Savings</b>	<b>MILCON</b>	<b>Annual O&amp;M</b>
CORE MODEL			
6 PAA	\$5,478,489		
8 PAA	\$7,635,664		
TDY Per Diem	\$99,008		
168 <sup>th</sup> FH Reduction			
6 PAA	\$634,580		
8 PAA	\$829,559		
FACILITIES			
2 <sup>nd</sup> Maint. Bay		\$6,000,000	\$35,000
New Hangar		\$7,800,000	\$45,000
Old SAC hangar		---	\$203,000

## **Alternative 2 – Traditional ANG Unit**

This option would transfer either six or eight aircraft from either an active duty squadron or an ARC unit to the 168 ARW. The 168 ARW would robust to a 14 – 16 PAA ANG wing composed of the traditional 25/75 percent full-time/part-time split. This paper assumes the airframes required to robust the 168 ARW would come from an active duty organization.

**Cost-Benefit Analysis using the CORE Model.** This second alternative used the same assumptions as the first alternative (reverse associate unit). The only difference is that all manpower authorizations associated with the active duty airframes transferred to the 168 ARW would be eliminated. The all manpower authorization required by the 168 ARW (Table 13) would be ANG personnel.

Table 12 lists the personnel numbers that were supplied by HQ USAF/PEP. The personnel numbers associated with the six PAA and eight PAA squadron sizes would be those eliminated from active duty under this proposal. The remaining personnel would be reassigned to the existing squadron where the airframes are assigned.

**Table 12. Active Duty KC-135 Personnel Positions Per Various Squadron Sizes**

Sq. Size	Aircrew Personnel		Maintenance Personnel			Squadron Staff			Total Primary Program Element			Base Operating Support			Grand Totals		
	OFF	ENL	OFF	ENL	CIV	OFF	ENL	CIV	OFF	ENL	CIV	OFF	ENL	CIV	OFF	ENL	CIV
12	49	16	0	204	0	3	18	0	38	238	0	0	21	7	38	259	7
6	18	9	0	152	0	3	10	0	21	196	0	0	13	4	21	209	4
8	22	11	0	203	0	3	10	0	25	224	0	0	16	5	25	240	5

Based on AFI 65-503 and conversations with various 168 ARW maintenance officers, the 168<sup>th</sup> would require the estimated manpower authorizations in Table 13.

**Table 13. Additional Manpower Positions Required by 168 ARW**

Sq. Size	Operations Group				Logistics Group			Grand Totals					
	AGR		Drill		Tech.	Drill		AGR		Tech.		Dill	
PAA	OFF	ENL	OFF	ENL	TECH	OFF	ENL	OFF	ENL	TECH	OFF	ENL	ENL
6	7	9	12	9	42	0	126	7	9	42	12	135	
8	9	9	14	11	50	0	150	9	9	50	14	161	

**Table 14. Traditional ANG PAA Increase CORE Model Results**

	<b>Active Duty 6 PAA</b>	<b>Active Duty 8 PAA</b>	<b>6 PAA Increase</b>	<b>8 PAA increase</b>
<b>OPERATIONS</b>				
Aircrew	\$1,585,325	\$2,113,766	\$843,835	\$1,081,895
Organizational Maint.				
Military Pay	\$5,310,272	\$7,092,008	\$0	\$0
Technician Pay	\$0	\$0	\$1,867,236	\$2,222,900
Drill Officer Pay	\$0	\$0	\$0	\$0
Drill Enlisted Pay	\$0	\$0	\$679,014	\$808,350
Unit Staff				
Military Pay	\$588,376	\$588,376	\$490,060	\$490,060
Security (Mil. Pay)	\$0	\$0	\$0	\$0
<b>UNIT LEVEL CONSUMPTION</b>	\$3,364,884	\$4,486,512	\$3,476,304	\$4,516,224
<b>DEPOT LEVEL MAINTENANCE</b>	\$1,175,166	\$1,566,888	\$1,176,186	\$1,567,160
<b>INDIRECT SUPPORT</b>				
Non-pay/Material	\$625,600	\$788,800	\$43,520	\$48,960
Pilot Training	\$436,615	\$582,153	\$390,212	\$520,282
Boom Training	\$44,602	\$59,469	\$43,479	\$57,972
Non-Aircrew Training				
Officer	\$8,721	\$6,038	\$0	\$0
Enlisted	\$292,673	\$370,314	\$206,886	\$243,395
PCS				
Officers	\$296,919	\$353,475	\$98,793	\$127,251
Enlisted	\$1,737,417	\$2,202,945	\$74,817	\$74,817
BOS				
Military	\$454,168	\$558,976	\$0	\$0
<b>GRAND TOTALS</b>	<b>\$15,920,737</b>	<b>\$20,769,721</b>	<b>\$9,390,521</b>	<b>\$11,759,266</b>

**The ANG Six Step Process.** All of the criteria for the ANG six step process in evaluating a force structure change remains the same as the first alternative except for one. The airframes and some associated maintenance equipment would have to be transferred from one organization to another. The maintenance manning manpower

numbers of technician and traditional ANG members should remain about the same. The additional two or three AGR aircrews that a six or eight PAA increase would provide should allow the 168<sup>th</sup> to support all Pony Express taskings without outside augmentation. Recruitment of another six or seven traditional aircrews might pose a challenge with the current airline hiring boom. There appears to be enough trained military pilots and civilian pilot and boom operator applicants that traditional aircrew recruitment should not be a concern over the long run. However, due to the strong commercial market for pilots, the recruiting and filling of the newly authorized aircrew positions would probably take longer than it historically has (17). As with every other ANG organization, the participation of traditional aircrew members has declined considerably in the last few years as the airline hiring boom continues. Unlike the RAU concept, an increase of six or eight PAA with a 25/75 percent mix of AGR/traditional aircrew members might not be able to cover as many of the out of area, short notice taskings, that a RAU would be capable of. The 168<sup>th</sup> would still be capable, however, of supporting more than 75% of the tanker TDY commitments in Alaska and thus still increase the efficiency of air refueling operations in the North Pacific Theater while simultaneously eliminating the short notice taskings to Eielson.

**Table 15. ANG Six Step Checklist for a Traditional ANG Squadron**

FACTORS	CRITERIA			
	EXCELLENT	GOOD	MARGINAL	POOR
<b>OPERATIONAL CAPABILITY</b>				
Unit Equipment	Modern, compatible with Tasking & Activities <b>X</b>	Earlier Generation, but Compatible	Earlier Generation, Some Incompatibility	Obsolete, Incompatible
Equipment on Hand	90 – 100%	75 – 90%	--	Less than 75% <b>X</b>
Unit Performance	Meets/Exceeds Established Standards <b>X</b>	--	Marginal	Unsatisfactory
Training Limitations –	No Operational / Training Constraints <b>X</b>	Some Limitations, but Alternatives Avail.	Can Accomplish Basic Proficiency Training	No Tactical Realism; No local alt. Avail.
Total Force Contribution and Relevancy	Essential <b>X</b>	Augmenting	Useful	Low Priority
<b>FACILITIES</b>				
Real Estate Availability	Adequate; Good Growth Capability <b>X</b>	Adequate; Limited Growth Capability	Marginal/Minor Land Acquisition Required	Inadequate; Major Land Acquisition Require / Not Possible
Construction Required	0 - \$5Million	\$5M - \$10M <b>X</b>	\$10M - \$20M	Over \$20M
Maintenance Repair	0 - \$1Million <b>X</b>	\$1M - \$3M	\$3M - \$6M	Over \$6M
<b>MISSION TASKING</b>				
Wartime Tasked	90 – 100% <b>X</b>	75 – 90%	50 – 75%	Less than 50%
Ability to Support Peacetime OPTEMPO	Able to Support 75 – 100% of AD TDY requirement <b>X</b>	Able to support 50-75% of AD TDY Requirement	Able to Support 25 – 50% of AD TDY Requirement	Able to Support 0 – 25% of AD TDY Requirement
Cross-Mission Impact	Provides Essential Support to Other Units/Missions <b>X</b>	--	--	Provides Little or No Support to Other Units Missions

**Table 15. ANG Six Step Checklist for a Traditional ANG Squadron (Continued)**

<b>DEMOGRAPHICS</b>				
Available Skill Pool	At Least 90% of Required	At least 75%, but Favorable Trends	At least 75%, but Unfavorable Trends	Support less than 75% of Needed Skill Positions
Manning	X 95% or more	90 – 95%	85-90%	Less than 85% likely to meet requirements
Retention	X ← ← X At Least 90% of Critical Skills	85-90% of Critical Skills	80 – 85% of Critical Skills	Unable to retain 80% of Critical Skills
<b>POLITICAL ENVIRONMENT</b>				
Community Willingness to Accommodate Change	Committed to Retaining Unit			Actively Seeking to Convert ANG Facilities to Other Uses
Public Acceptance	X Active Local and State Support	Neutral Local; Active State Support	Neutral Local and State Support	Negative Local and State Support
<b>ENVIRONMENTAL FACTORS</b>				
Encroachment	None; None Projected	Some; Slow Development	Moderate: Likely to Constrain Operations in Next Five Years	Already Constrains Operationally; Trending Worse
Noise	X Not Sensitive; No Operational Constraints	Some Sensitivity; Minor Operational Constraints	Moderate Sensitivity; Significant Operational Constraints	Strong Sensitivity; Major Operational Constraints
Environmental Assessment	X Little or no impact anticipated	Environmental Input Statement (EIS) with only Minor Findings	EIS with Major Findings	EIS with Significant Findings

**Benefits.**

- 1) Short notice tasking deployments from Eielson will be easier to accomplish with the additional full-time personnel, although not to the extent as the RAU proposal. AMC will not have to deploy 92 WG crews to Eielson for no-notice Pony Express taskings.
- 2) Additional tankers at Eielson should be able to support any Pacific AEF package deploying out of 11<sup>th</sup> Air Force without augmentation.

- 3) Decrease deployments for active duty crews in Alaska. The end result is a more efficient use of airframes and aircrews within the North Pacific Region and potentially in the PACAF Theater. The 168 ARW, even as an ANG wing with the traditional 25/75 percent full-timer to part-timer personnel mix, should be able to use the airframes in a more cost efficient manner than the active duty and ARC tankers currently deploying to Alaska.
- 4) Increased maintenance support at Eielson should be able to provide 24-hour maintenance support.
- 5) The AGR staff personnel would allow for manning of AMC unique Command and Control systems.
- 6) The annual savings of an estimated \$7.3 - \$9.9 million in total costs would pay in one year for the additional maintenance bay to the 168<sup>th</sup> hangar.
- 7) No additional Operations Group MILCON would be required. The 168<sup>th</sup> should be able to internally work the Operations Group space issue.

**Drawbacks.**

- 1) The number of KC-135Rs in the active inventory would be reduced by six or eight airframes.
- 2) AMC and PACAF would not feel an ANG wing would be as reliable as a RAU without a MOA spelling out what the 168 ARW's air refueling responsibilities and guarantees would be.
- 3) A MOA must be worked out with the host unit at Eielson AFB for additional use of the old SAC hangar if the second maintenance bay addition is not funded or if another independent hangar is not built.



- 4) An addition to the existing 168 ARW supply building would probably be required; but only an addition.
- 5) With more traditional aircrew members, the 168<sup>th</sup> would require more mandays for traditional aircrew members and crew chiefs. However, this paper will assume any additional requirement of mandays to support this proposal will simply replace on a one-for-one basis the number of mandays currently required to support CONUS ARC tankers in the Pacific Theater.
- 6) As the pilot shortage continues, the reliance on those traditional guard members who have extensive time available, such as seasonal workers and the underemployed, to support higher OPSTEMPOs is greatly reduced as those members join the airlines. By increasing its PAA, the 168 ARW would have to commit through an MOA to AMC and PACAF that it would support a specified amount of the air refueling requirements in the North Pacific Theater. This would increase the 168 ARW OPSTEMPO at home station (Eielson) from its current levels. If there are not enough part-time aircrews available to support the increased taskings, the OPSTEMPO could rise significantly for the full-timers.
- 7) Recruiting part-time pilots will be more challenging than in the past, and will probably take longer to fill (28). A greater percentage of the new hires might be former fighter pilots versus tanker pilots (17).

**Summary of Savings and Costs.** Table 16 represents the various savings and cost factors identified with this second proposal.

**Table 16. Summary of Savings and Costs for a PAA Increase**

<b>Cost/Savings Category</b>	<b>Annual Savings</b>	<b>MILCON</b>	<b>Annual O&amp;M</b>
CORE MODEL			
6 PAA	\$6,530,216		
8 PAA	\$9,010,455		
TDY Per Diem	\$99,008		
168 <sup>th</sup> FH Reduction			
6 PAA	\$634,580		
8 PAA	\$829,559		
FACILITIES			
2 <sup>nd</sup> Maint. Bay		\$6,000,000	\$35,000
New Hangar		\$7,800,000	\$45,000
Old SAC hangar		---	\$203,000

### **Alternative 3 – Active Guard Reserve (AGR) Unit**

This Alternative is similar to alternative one except that instead of funding the additional Operations Group billets as Title 10 active duty billets, they would be filled as Title 32, active duty Air National Guard billets. This unique ANG arrangement, which would increase the ratio of full-timers to part-timers, is something that the ANG LRP warns against, but would serve several purposes. First, the additional AGR operations personnel, technician maintenance personnel, and operations support personnel would be required to step in and fill the higher OPSTEMPO that would be expected by AMC and PACAF. Second, the National Guard Bureau (NGB), PACAF, AMC, and the Governor of Alaska could develop a MOA that would delineate which air refueling missions the 168<sup>th</sup> would be required to support under reasonable conditions. This should alleviate any AMC and PACAF reservations about the availability and reliability of the 168<sup>th</sup>. The 168<sup>th</sup> has a similar type of MOA signed by the Governor of Alaska, PACAF and the NGB

concerning 168<sup>th</sup> support to a PACAF Contingency Plan. The final and maybe most important purpose this unique arrangement would serve is to retain the use of KC-135R aircraft commanders, instructors, and experienced boom operators that have decided to leave the active Air Force. A majority of the aircrew members departing the active Air Force cite the high OPSTEMPO, frequent moves, and other quality of life factors that serving as an AGR member would reduce or eliminate. Recruitment and filling these new AGR jobs, with the proper advertisement, would be much easier than recruiting traditional ANG aircrew members during the airline hiring boom (28). Many aircrew members who have departed the Active Air Force would gladly serve their remaining eight to ten years in an AGR status to qualify for an active duty retirement. The benefit to the Air Force and ANG is the retention of veteran aircrew members performing the same job in the North Pacific Theater, but in a more efficient manner.

**Aircrew Retention Factor.** It costs about \$3.4 million to train and experience a C-141 pilot (8:6F3-8). This paper will assume the same amount applies to experiencing a KC-135R pilot to the nine-year point. The primary reasons that KC-135R pilots are departing the active USAF are the days way from home, the uncertainty of the new assignment system, and other quality of life factors. Some ANG KC-135 units are reporting up to 30 active duty applicants for each ANG pilot opening (24). This indicates there would be enough KC-135R pilots departing the Air Force who would be interested in accepting a full-time AGR position. This benefits the KC-135R pilot departing the active duty Air Force because he or she can continue to work towards their active duty retirement and maintain self-control of where they will be living until they do retire. The USAF as a whole benefits because it would retain the use of the \$3.4 million it has

already invested to mature and experience that same pilot. In effect, these pilots will be performing and supporting the USAF mission as if they were on active duty.

**“Our retention problem may become so severe that it may impact our readiness....I will leave no stone unturned to work this problem.”**

**General Walter Kross, AMC/CC (2)**

The 1997 AMC Safety Stand-Down Day (SSDD) summary of HQ AMC and Numbered Air Force (NAF) Responses to Unit Inputs identifies three times the low KC-135 crew ratio as a safety risk. The SSDD summary states the AMC staff is addressing the need for 75 additional KC-135 crews through the upcoming FY00-05 Program Objective Memorandum (POM). These crews represent the manning shortfall required to meet wartime tanker requirements as stated in the Defense Planning Guidance. If accepted, it should lower the current PERSTEMPO of KC-135 active duty crews for contingencies and other operations. However, the Air Force Group (AFG) marked this initiative as a NO during their deliberations and the Air Force Board, on 3 April 1998, was briefed on this same issue and concurred with the AFG (12:2, 3, 11). This proposal to recruit and retain experienced aircrew members who have departed the active Air Force would help reduce the shortfall of active duty KC-135 crews. Table 17 represents the potential value of retaining experienced aircrew members by enticing them to join the ANG as an AGR member.

**Table 17. Potential Aircrew Retention Savings to the USAF/ANG**

<b>PAA</b>	<b>Crew Ratio</b>	<b>Total Pilots</b>	<b>Staff Pilots</b>	<b>Total Pilots</b>	<b>75% Crews From Active USAF</b>	<b>Replacement Training Costs</b>	<b>AGR Retention Value</b>
6	1.27	16	3	19	13	\$3,400,000	\$40,800,000
8	1.27	20	3	23	17	\$3,400,000	\$51,000,000

Assuming it costs \$3.4 million to train and experience a KC-135R pilot to the nine year point (8:6F3-8), and that 75 percent of the new AGRs are aircrew members who have departed the Active Air Force, this proposal would result in the aircrew replacement/ retention values as noted in Table 17. The factors as to why the 168 ARW should be the first ARC unit to attempt this type of arrangement (which in reality creates the dual track pilot – one track that wants to stay in the cockpit and fly for a career and the other track that gains a broad base of experience required for General Officer leadership) are as follows:

- 1) The 168 ARW is based in the warfighting theater where it is planned to support most of its tasked contingency and war plans, thus it does not need to deploy. For contingencies in the Pacific, additional tankers must be deployed to Alaska anyway.
- 2) The 168 ARW, in addition to the personnel savings, will also save the flying hour and per diem costs identified in this research, resulting in a more efficient use of airframes and personnel.
- 3) A majority of the high PERSTEMPO that the 168<sup>th</sup> incurs is in-place support, similar to Kadena and Mildenhall. Therefore, both sides win. The USAF obtains a more efficient use of its KC-135s by increasing the number of tankers available for tasking

in a unit with the highest PERSTEMPO in the 11 AF. The AGR aircrew members receive the more stable life they are seeking by supporting the Pacific and North Pacific air refueling requirements identified in this paper from Eielson AFB.

**Cost-Benefit Analysis using the CORE Model.** This third alternative used the same assumptions as the second alternative (traditional ANG squadron). The only difference is all Operations Group personnel (aircrews and support) would be AGR members.

Table 18 lists the personnel numbers that were supplied by HQ USAF/PEP. The personnel numbers associated with the six PAA and eight PAA squadron sizes would be those eliminated from active duty under this proposal. The remaining personnel would be reassigned to the existing squadron where the airframes would be assigned.

**Table 18. Active Duty KC-135 Personnel Positions Per Various Squadron Sizes**

Sq. Size	Aircrew Personnel		Maintenance Personnel			Squadron Staff			Total Primary Program Element			Base Operating Support			Grand Totals		
	OFF	ENL	OFF	ENL	CIV	OFF	ENL	CIV	OFF	ENL	CIV	OFF	ENL	CIV	OFF	ENL	CIV
12	49	16	0	204	0	3	18	0	38	238	0	0	21	7	38	259	7
6	18	9	0	152	0	3	10	0	21	196	0	0	13	4	21	209	4
8	22	11	0	203	0	3	10	0	25	224	0	0	16	5	25	240	5

Based on AFI 65-503 and conversations with various 168 ARW maintenance officers, the 168<sup>th</sup> would require the estimated manpower authorizations in Table 19.

**Table 19. Additional 168 ARW Manpower Positions Required**

Sq. Size	Operations Group				Logistics Group			Grand Totals					
	AGR		Drill		Tech.	Drill		AGR		Tech.	Dill		
PAA	OFF	ENL	OFF	ENL	TECH	OFF	ENL	OFF	ENL	TECH	OFF	ENL	
6	19	18	0	0	42	0	126	19	18	42	0	126	
8	23	20	0	0	50	0	150	23	20	50	0	150	

**Table 20. AGR Unit Concept CORE Model Results**

	<b>Active Duty 6 PAA</b>	<b>Active Duty 8 PAA</b>	<b>6 PAA Increase</b>	<b>8 PAA increase</b>
<b>OPERATIONS</b>				
Aircrew	\$1,585,325	\$2,113,766	\$2,710,239	\$3,193,713
Organizational Maint.				
Military Pay	\$5,310,272	\$7,092,008	\$0	\$0
Technician Pay	\$0	\$0	\$1,867,236	\$2,222,900
Drill Officer Pay	\$0	\$0	\$0	\$0
Drill Enlisted Pay	\$0	\$0	\$679,014	\$808,350
Unit Staff				
Military Pay	\$588,376	\$588,376	\$725,766	\$725,766
Security (Mil. Pay)	\$0	\$0	\$0	\$0
<b>UNIT LEVEL CONSUMPTION</b>	\$3,364,884	\$4,486,512	\$3,476,304	\$4,516,224
<b>DEPOT LEVEL MAINTENANCE</b>	\$1,175,166	\$1,566,888	\$1,176,186	\$1,567,160
<b>INDIRECT SUPPORT</b>				
Non-pay/Material	\$625,600	\$788,800	\$100,640	\$116,960
Pilot Training	\$436,615	\$582,153	\$390,212	\$520,282
Boom Training	\$44,602	\$59,469	\$43,479	\$57,972
Non-Aircrew Training				
Officer	\$8,721	\$6,038	\$0	\$0
Enlisted	\$292,673	\$370,314	\$206,886	\$243,395
PCS				
Officers	\$296,919	\$353,475	\$268,641	\$325,197
Enlisted	\$1,737,417	\$2,202,945	\$149,634	\$166,260
BOS				
Military	\$454,168	\$558,976	\$0	\$0
<b>GRAND TOTALS</b>	<b>\$15,920,737</b>	<b>\$20,769,721</b>	<b>\$11,794,236</b>	<b>\$14,464,179</b>

**The ANG Six Step Process.** All of the criteria for the ANG six step process in evaluating a force structure change remains the same as for the second alternative. However, like the RAU proposal, the additional eight and ten AGR crews would allow the 168<sup>th</sup> to respond to short notice taskings both in the North Pacific Region and throughout PACAF. Due to the unique location of Eielson AFB, these same crews could deploy to Europe or the Middle East if required.

**Table 21. ANG Six Step Checklist for an AGR Flying Squadron**

FACTORS	CRITERIA			
	EXCELLENT	GOOD	MARGINAL	POOR
<b>OPERATIONAL CAPABILITY</b>				
Unit Equipment	Modern, compatible with Tasking & Activities <b>X</b>	Earlier Generation, but Compatible	Earlier Generation, Some Incompatibility	Obsolete, Incompatible
Equipment on Hand	90 - 100%	75 - 90%	--	Less than 75% <b>X</b>
Unit Performance	Meets/Exceeds Established Standards <b>X</b>	--	Marginal	Unsatisfactory
Training Limitations -	No Operational / Training Constraints <b>X</b>	Some Limitations, but Alternatives Avail.	Can Accomplish Basic Proficiency Training	No Tactical Realism; No local alt. Avail.
Total Force Contribution and Relevancy	Essential <b>X</b>	Augmenting	Useful	Low Priority
<b>FACILITIES</b>				
Real Estate Availability	Adequate; Good Growth Capability <b>X</b>	Adequate; Limited Growth Capability	Marginal/Minor Land Acquisition Required	Inadequate; Major Land Acquisition Require / Not Possible
Construction Required	0 - \$5Million	\$5M - \$10M <b>X</b>	\$10M - \$20M	Over \$20M
Maintenance Repair	0 - \$1Million <b>X</b>	\$1M - \$3M	\$3M - \$6M	Over \$6M



**Table 21. ANG Six Step Checklist for an AGR Flying Squadron (Continued)**

<b>MISSION TASKING</b>				
Wartime Tasked	90 – 100%	75 – 90%	50 – 75%	Less than 50%
	<b>X</b>			
Ability to Support Peacetime OPTEMPO	Able to Support 75 – 100% of AD TDY requirement	Able to support 50-75% of AD TDY Requirement	Able to Support 25 – 50% of AD TDY Requirement	Able to Support 0 – 25% of AD TDY Requirement
	<b>X</b>			
Cross-Mission Impact	Provides Essential Support to Other Units/Missions	–	–	Provides Little or No Support to Other Units Missions
	<b>X</b>			
<b>DEMOGRAPHICS</b>				
Available Skill Pool	At Least 90% of Required	At least 75%, but Favorable Trends	At least 75%, but Unfavorable Trends	Support less than 75% of Needed Skill Positions
	<b>X</b>			
Manning	95% or more	90 – 95%	85-90%	Less than 85% likely to meet requirements
	<b>X</b>	← ← <b>X</b>		
Retention	At Least 90% of Critical Skills	85-90% of Critical Skills	80 – 85% of Critical Skills	Unable to retain 80% of Critical Skills
	<b>X</b>			
<b>POLITICAL ENVIRONMENT</b>				
Community Willingness to Accommodate Change	Committed to Retaining Unit			Actively Seeking to Convert ANG Facilities to Other Uses
	<b>X</b>			
Public Acceptance	Active Local and State Support	Neutral Local; Active State Support	Neutral Local and State Support	Negative Local and State Support
	<b>X</b>			
<b>ENVIRONMENTAL FACTORS</b>				
Encroachment	None; None Projected	Some; Slow Development	Moderate: Likely to Constrain Operations in Next Five Years	Already Constrains Operationally; Trending Worse
	<b>X</b>			
Noise	Not Sensitive; No Operational Constraints	Some Sensitivity; Minor Operational Constraints	Moderate Sensitivity: Significant Operational Constraints	Strong Sensitivity; Major Operational Constraints
	<b>X</b>			
Environmental Assessment	Little or no impact anticipated	Environmental Input Statement (EIS) with only Minor Findings	EIS with Major Findings	EIS with Significant Findings
	<b>X</b>			

**Benefits.**

- 1) Same benefits as listed in the RAU unit proposal.
- 2) Additional operations support AGRs will allow manning of AMC Command and Control systems.
- 3) Retention of aircrew members who have already departed the active Air Force. The savings in training and maturing aircrew replacements would be significant.
- 4) Less active duty KC-135 cockpits to fill and more efficient use of airframes.
- 5) A MOA between PACAF, AMC, NGB, and the Governor of Alaska would provide PACAF and AMC the guarantees of which air refueling requirements would be covered within the North Pacific Region. This would reduce or eliminate active duty concerns about placing more KC-135Rs in the ARC.
- 6) The annual savings of an estimated \$4.9 - \$7.2 million in total costs would pay for the additional maintenance bay to the 168<sup>th</sup> hangar in about one year.

**Drawbacks.**

- 1) An office location for the additional AGR members will be needed at Eielson.
- 2) A MOA must be worked out with Eielson for additional use of the SAC hangar if a new hangar or a second bay to the existing hangar is not built.
- 3) An addition to the existing 168 ARW supply building would probably be required.
- 4) The ANG LRP warns against increasing the ratio of full-timer to part-timers by more than the current 25% - 75%. The ANG has found that to the degree the full-time/M-day mix swings in favor of the full-timers, the proven militia tradition will be weakened. Furthermore, experience has shown that as the full-timers grow in proportion to the part-timers, the risk to the citizen soldier tradition increases. This

could result, ultimately, in lower guardsmen recruiting and retention rates and attendant problems. However, drastic times brought on by aircrew retention problems in both the active Air Force and the ARC call for drastic measures. As noted in this paper, the 168<sup>th</sup> is a unique ANG unit, and due to its location, taskings, and PERSTEMPO, at times operates more like an active duty unit than a traditional ANG unit. The 168 ARW is the best candidate to be the first ARC organization to attempt this proposed force structure change due to its unique geographic location and the increase in efficiency of USAF tanker operations that would result.

**Summary of Savings and Costs.** Table 22 represents the various savings and cost factors identified with this third proposal.

**Table 22. Summary of Savings and Costs for an AGR Squadron**

<b>Cost/Savings Category</b>	<b>Annual Savings</b>	<b>Aircrew Retention Value</b>	<b>MILCON</b>	<b>Annual O&amp;M</b>
<b>CORE MODEL</b>				
6 PAA	\$4,126,501	\$40,800,000		
8 PAA	\$6,305,542	\$51,000,000		
TDY Per Diem	\$99,008			
168 <sup>th</sup> FH Reduction				
6 PAA	\$634,580			
8 PAA	\$829,559			
<b>FACILITIES</b>				
2 <sup>nd</sup> Maint. Bay			\$6,000,000	\$35,000
New Hangar			\$7,800,000	\$45,000
Old SAC hangar			---	\$203,000

#### **Alternative 4 – Alaska Tanker Task Force**

The need for additional air refueling assets within the North Pacific has been clearly illustrated in this paper. If the 168<sup>th</sup> PAA must remain at its current strength, the only feasible alternate option is to rotate TDY tankers at Eielson AFB to support the North Pacific Theater's air refueling requirements. Three TDY KC-135s would probably be required to support the recurring air refueling requirements in the North Pacific as depicted in the table below:

**Table 23. Number of KC-135s Required to Support an Alaskan Tanker Task Force**

<b>Mission</b>	<b>Line 1</b>	<b>Line 2</b>	<b>Line 3</b>
C-17 Channel	X		
Pony Express/Busy Relay/Coronet/PACAF 51 series training, exercises		X	
Spare for Lines 1 and 2			X

Line one would be scheduled to fly every day, providing the C-17 does not cancel. Currently, the C-17 is canceling 34% of the time. Lines one and two could alternate to accommodate aircrew currency requirements and expect to fly about every other day between the C-17 Channel mission, Pony Expresses, Busy Relays, Coronet moves, the local PACAF 51-series training within the state, and some exercises. Line three would be required to operate as a spare for lines one and two, and during events such as Coronet moves, exercises, or Pony Express taskings, would be required to fly.

Fewer aircraft are required to operate a TTF because no PDM or phase maintenance is required, nor are there any aircrew training requirements (other than proficiency) or TDY commitments to maintain. The former SAC hangar should be sufficient to support a TTF operation once a MOA with the host wing is agreed upon.

**Cost-Benefit Analysis.** This alternative was based on the following assumptions:

- 1) As outlined above, only three TDY KC-135s would be required.
- 2) The 168 ARW would require additional maintenance and operations support manpower billets. Operations support would include six AGR officers and four enlisted positions to manage the TTF (to include Coronet planning), and another five AGR enlisted positions for life support and command and control. Maintenance would require 27 Military Technician positions.
- 3) Billeting, transportation, supply, and fuels, as they exist today, are capable of handling the presence of a TTF at Eielson AFB.
- 4) Aircrews are Pacer CRAG crews (three-person aircrew plus two crew chiefs).
- 5) All ATTF personnel will be billeted on-base with non availability of meals (\$43/day as an average).
- 6) Two-week rotations were based on one-day overlap (15 day manday factor and 14.5 day per diem factor).
- 7) One-month rotations were based on one-day overlap (29 days for mandays and 28.5 for per diem factor).
- 8) The average manday cost for an officer is based on a Major with 14 years (\$137) and the average manday cost for enlisted person is based on a Technical Sergeant with 14 years (\$67).
- 9) 75% of the aircrews supporting the TTF will be ARC members. 90% of the ARC members will require mandays. All ARC crew chiefs will require mandays.

10)

**Table 24. Annual Per Diem and Manday Costs to Operate a TTF at Eielson AFB**

Line #	Mission Supported	Per Diem Costs/day		Manday Cost/day		Total Costs	
		Aircrew	Crew Chiefs	Aircrew* (\$341)	Crew Chiefs* (\$134)	2 week rotation (15 days) Per Diem / Manday	28 day rotation (29 days) Per Diem / Manday
1	Line 1	\$129	\$86	\$230	\$100	\$3,118 / 4,950	\$6,128 / 9,570
2	Line 2	\$129	\$86	\$230	\$100	\$3,118 / 4,950	\$6,128 / 9,570
3	Line 3	\$129	\$86	\$230	\$100	\$3,118 / 4,950	\$6,128 / 9,570
Cost per Rotation						\$9,354 / \$14,850	\$18,384 / \$28,710
Annual Cost Per Diem / Manday						\$243,204 / \$386,100	\$238,992 / \$373,230
Total Annual Cost						\$629,304	\$612,222

\* Refer to assumption 9.

Based on AFI 65-503, the 168<sup>th</sup> would require the estimated manpower authorizations in Table 25 operate a TTF consisting of three KC-135s.

**Table 25. Additional 168 ARW Manpower Required to Operate and Manage a TTF**

Sq. Size	Operations Group				Logistics Group			Grand Totals				
	AGR		Drill		Tech.	Drill		AGR		Tech.	Dill	
PAA	OFF	ENL	OFF	ENL	TECH	OFF	ENL	OFF	ENL	TECH	OFF	ENL
TTF	6	9	0	0	24	0	0	6	9	24	0	0

Personnel costs were computed in Table 26 using the cost data from AFI 65-503, attachment 22-1, dated 9 March 1998.

**Table 26. Additional 168 ARW Manpower Cost to Operate and Manage a TTF**

	Officer Pay	Enlisted Pay	Technician Pay	Manpower Numbers	Total
AGR Officer	\$96,531			6	\$579,186
AGR Enlisted		\$48,675		9	\$438,075
Technician			\$50,348	24	\$1,208,352
Total					\$2,225,613

**The ANG Six Step Process.** All of the criteria in the ANG six step process used in evaluating a force structure fall in the excellent criteria if the TTF uses the former SAC hangar.

**Table 27. ANG Six Step Checklist for an Alaskan Tanker Task Force**

FACTORS	CRITERIA			
	EXCELLENT	GOOD	MARGINAL	POOR
<b>OPERATIONAL CAPABILITY</b>				
Unit Equipment	Modern, compatible with Tasking & Activities <b>X</b>	Earlier Generation, but Compatible	Earlier Generation, Some Incompatibility	Obsolete, Incompatible
Equipment on Hand	90 – 100% <b>X</b>	75 – 90%	--	Less than 75%
Unit Performance	Meets/Exceeds Established Standards <b>X</b>	--	Marginal	Unsatisfactory
Training Limitations –	No Operational / Training Constraints <b>X</b>	Some Limitations, but Alternatives Avail.	Can Accomplish Basic Proficiency Training	No Tactical Realism; No local alt. Avail.
Total Force Contribution and Relevancy	Essential <b>X</b>	Augmenting	Useful	Low Priority
<b>FACILITIES</b>				
Real Estate Availability	Adequate; Good Growth Capability <b>X</b>	Adequate; Limited Growth Capability	Marginal/Minor Land Acquisition Required	Inadequate; Major Land Acquisition Require / Not Possible
Construction Required	0 - \$5Million <b>X</b>	\$5M - \$10M	\$10M - \$20M	Over \$20M
Maintenance Repair	0 - \$1Million <b>X</b>	\$1M - \$3M	\$3M - \$6M	Over \$6M
<b>MISSION TASKING</b>				
Wartime Tasked	90 – 100% <b>X</b>	75 – 90%	50 – 75%	Less than 50%
Ability to Support Peacetime OPTEMPO	Able to Support 75 – 100% of AD TDY requirement <b>X</b>	Able to support 50-75% of AD TDY Requirement	Able to Support 25 – 50% of AD TDY Requirement	Able to Support 0 – 25% of AD TDY Requirement
Cross-Mission Impact	Provides Essential Support to Other Units/Missions <b>X</b>	--	--	Provides Little or No Support to Other Units Missions

**Table 27. ANG Six Step Checklist for an Alaskan Tanker Task Force (Continued)**

<b>DEMOGRAPHICS</b>				
Available Skill Pool	At Least 90% of Required	At least 75%, but Favorable Trends	At least 75%, but Unfavorable Trends	Support less than 75% of Needed Skill Positions
Manning	<b>X</b> 95% or more	90 – 95%	85-90%	Less than 85% likely to meet requirements
Retention	<b>X</b> At Least 90% of Critical Skills <b>X</b>	← ← <b>X</b> 85-90% of Critical Skills	80 – 85% of Critical Skills	Unable to retain 80% of Critical Skills
<b>POLITICAL ENVIRONMENT</b>				
Community Willingness to Accommodate Change	Committed to Retaining Unit			Actively Seeking to Convert ANG Facilities to Other Uses
Public Acceptance	<b>X</b> Active Local and State Support <b>X</b>	Neutral Local; Active State Support	Neutral Local and State Support	Negative Local and State Support
<b>ENVIRONMENTAL FACTORS</b>				
Encroachment	None; None Projected	Some; Slow Development	Moderate: Likely to Constrain Operations in Next Five Years	Already Constrains Operationally; Trending Worse
Noise	<b>X</b> Not Sensitive; No Operational Constraints	Some Sensitivity; Minor Operational Constraints	Moderate Sensitivity: Significant Operational Constraints	Strong Sensitivity; Major Operational Constraints
Environmental Assessment	<b>X</b> Little or no impact anticipated <b>X</b>	Environmental Input Statement (EIS) with only Minor Findings	EIS with Major Findings	EIS with Significant Findings

**Benefits.**

- 1) Increase use of the ARC to relieve active duty deployments to Alaska.
- 2) Existing 168 ARW facilities, along with a MOA with the host wing to use the former SAC hanger when required, are more than adequate to support a TTF.
- 3) Short notice Active Duty KC-135R deployments to Alaska eliminated with TTF.
- 4) No maintenance, phase, or aircrew training requirements, so less airframes would be required at Eielson.



### **Drawbacks.**

- 1) OPSTEMPO and PERSTEMPO are not reduced for ARC forces.
- 2) Potential TDY maintenance problems in the arctic weather.
- 3) Additional full-time AGR and technician positions required for Command and Control, Maintenance, and Operations TTF staff.
- 4) Per Diem costs, ARC manday costs, and the cost of additional full time positions to operate and maintain the TTF cost more than the per diem saved.

### **Summary of Savings and Costs.**

Table 28 represents the various savings and cost factors identified with this fourth proposal. A TTF will cost more than any of the other alternate proposals because it does not reduce active duty manpower authorizations and it does not reduce the per diem costs associated with TDY crews. A TDY Tanker Task Force at Eielson may reduce active duty short notice TDY taskings to Eielson, but the additional manpower, manday, and per diem costs are substantial.

**Table 28. Summary of Savings and Costs for an Alaskan TTF at Eielson AFB**

<b>Cost/Savings Category</b>	<b>14 Day Rotation</b>	<b>28 Day Rotation</b>
Present Day Per Diem Savings	(\$99,008)	(\$99,008)
TTF Per Diem cost	\$243,204	\$238,992
TTF Manday cost	\$386,100	\$373,230
TTF Full-time manpower cost	\$2,225,613	\$2,225,613
<b>TOTAL SAVINGS / (COST)</b>	<b>(\$2,755,909)</b>	<b>(\$2,738,827)</b>

## V. CONCLUSION

### **Findings**

This paper has shown there *are* more efficient and cost effective methods to providing air refueling support in the North Pacific Theater. The primary factors that must be analyzed to justify each of the proposals in this paper are the annual cost savings of each alternative, the availability and reliability of the aircrews, maintenance support, and airframes to AMC and PACAF, and the added capability and flexibility each alternative provides to the Total Force concept. Although increasing the PAA of the 168 ARW as a traditional ANG wing is the most cost effective (annual cost savings of between \$7.3 - \$9.9 million), it might not provide the availability, reliability, and flexibility of a KC-135 wing that AMC and PACAF desires. The reverse associate wing concept best satisfies the three primary analysis factors and would provide a cost savings of between \$6.2 - \$8.6 million on an annual basis. The third proposal to increase both the PAA and the ratio of authorized AGR aircrews to traditional crews should also satisfy the three primary analysis factors, but has the added benefit of aircrew retention. The value of retaining experienced aircrew members demands this option be given serious consideration. With an estimate annual O&S savings of between \$4.9 - \$7.2 million, and the continued use of up to \$51 million in aircrew training and maturing costs, this option seems to present the most short term and long term gains to the Air Force with minimal risk.

## **Recommendation**

This study indicates that the 168<sup>th</sup> Air Refueling Squadron (of the 168<sup>th</sup> Air Refueling Wing) should be increased to a 14, 15, or 16 PAA squadron from its current eight PAA plus one BAI status. The additional aircrew members and operations support personnel UMD positions should be assigned as AGR members. Although this option would not save as many annual O&S dollars as a reverse associate unit, the value of retaining prior experienced KC-135 aircrew members clearly makes this option preferable.

Recommend AMC fund these AGR positions for a certain timeframe, such as for five years. If AMC and PACAF are satisfied with the agreement, these USAF funded positions could convert to ANG funded positions. If AMC and PACAF are not satisfied with the 168<sup>th</sup>'s performance, this option would also give the USAF the flexibility to convert the additional AGR positions into a reverse associate unit, or simply reclaim the airframes and withdraw the AGR funding. The one time cost of adding a second bay to the existing 168<sup>th</sup> maintenance hangar would be recovered in the first year to year and a half of operation. This maintenance facility would then stand ready to support tanker operations regardless any future force structure decision. AMC would benefit because, since they would control the initial funding of the new AGR positions, they could tailor 168 ARW air refueling support for AMC's daily peacetime air refueling requirements in the North Pacific Theater. Both the Reverse Associate Unit concept and the AGR unit concept increase to the 168 ARW options clearly have the best interest of the USAF at mind, have minimal risk, and the potential for substantial annual savings.

## **Suggestions for Further Research**

- 1) Reverse Associate Unit concept for ANG wings.
- 2) For unique ANG units such as PACAF or Special Operations gained units, look at increasing the AGR positions as an effective cost alternative to retaining experienced pilots. The retention savings could be significant.
- 3) Identify an USAF KC-135 basing strategy for more efficient use of the tanker fleet.

## Appendix A: 168 ARW Air Refueling Customers FY93 – FY97

**Table 29. FY97 168 ARW Air Refueling Data**

				% of Total	% of Total	% of Total		
PACAF	# Sorties	Offload (1,000Lbs)	Hours	Sorties	Offload	Hours	Hours/ Sortie	Offload/Sortie (1,000Lbs)
PACAF 51-Series	163	4,190.8	538.9	18.5%	20.4%	17.8%	3.3	25.7
Cope Thunder	113	3,348.1	258.9	12.8%	16.3%	8.6%	2.3	29.6
Coronet West	22	1,579.1	119.6	2.5%	7.7%	4.0%	5.4	71.8
CERI Support	8	221.7	24.5	0.9%	1.1%	0.8%	3.1	27.7
PACAF Airlift	56	-	216.2	6.3%	0.0%	7.1%	3.9	0.0
Cobra Gold (Thailand)	2	58.1	14.2	0.2%	0.3%	0.5%	7.1	29.1
Commando Sling (Singapore)	6	-	28.6	0.7%	0.0%	0.9%	4.8	0.0
Cope Taufan (Malaysia)	7	17.2	34.5	0.8%	0.1%	1.1%	4.9	2.5
Tandem Thrust (Guam)	10	207.8	66.9	1.1%	1.0%	2.2%	6.7	20.8
Cope Tiger (Thailand)	8	137.9	52.4	0.9%	0.7%	1.7%	6.6	17.2
Kadena Support	7	158.9	41.1	0.8%	0.8%	1.4%	5.9	22.7
Keen Edge (Japan)	4	91.5	28.3	0.5%	0.4%	0.9%	7.1	22.9
<i>PACAF DIRECTED</i>	<i>406</i>	<i>10,011.1</i>	<i>1,424.1</i>	<i>46.0%</i>	<i>48.8%</i>	<i>47.1%</i>	<i>3.5</i>	<i>24.7</i>
<b>ANR/11AF</b>								
CERE Support	4	237.0	13.6	0.5%	1.2%	0.4%	3.4	59.3
Amalgam Warrior	9	875.5	41.8	1.0%	4.3%	1.4%	4.6	97.3
Fencing Brave/Spade/Virgo	16	641.5	72.2	1.8%	3.1%	2.4%	4.5	40.1
11AF Movement Support	6	85.7	27.3	0.7%	0.4%	0.9%	4.6	14.3
Distant Frontier	1	70.0	5.1	0.1%	0.3%	0.2%	5.1	70.0
Northern Edge	2	146.7	2.7	0.2%	0.7%	0.1%	1.4	73.4
<i>ANR/11AF DIRECTED</i>	<i>38</i>	<i>2,056.4</i>	<i>162.7</i>	<i>4.3%</i>	<i>10.0%</i>	<i>5.4%</i>	<i>4.3</i>	<i>54.1</i>
<i>PACAF TOTAL</i>	<i>444</i>	<i>12,067.5</i>	<i>1,586.8</i>	<i>50.3%</i>	<i>58.9%</i>	<i>52.5%</i>	<i>3.6</i>	<i>27.2</i>
<b>HHQ</b>								
Busy Relay (RC-135)	12	711.7	62.5	1.4%	3.5%	2.1%	5.2	59.3
Pony Express (RC-135)	21	1,076.8	99.7	2.4%	5.3%	3.3%	4.7	51.3
Distant Phoenix (RC-135W)	1	85.0	5.5	0.1%	0.4%	0.2%	5.5	85.0
Air Expeditionary Forces	2	190.4	8.3	0.2%	0.9%	0.3%	4.2	95.2
E-4 Support	6	447.0	27.2	0.7%	2.2%	0.9%	4.5	74.5
Silver Bullet Support	10	850.6	29.1	1.1%	4.1%	1.0%	2.9	85.1
<i>HHQ TOTAL</i>	<i>52</i>	<i>3,361.5</i>	<i>232.3</i>	<i>5.9%</i>	<i>16.4%</i>	<i>7.7%</i>	<i>4.5</i>	<i>64.6</i>
<b>OTHER</b>								
Tokyo Talon (Rollers)	9	106.1	59.3	1.0%	0.5%	2.0%	6.6	11.8
Pacific Express (Rollers)	16	93.0	93.5	1.8%	0.5%	3.1%	5.8	5.8
Cargo West	26	1,570.3	113.5	2.9%	7.7%	3.8%	4.4	60.4
Business Effort	81	1,238.1	320.6	9.2%	6.0%	10.6%	4.0	15.3
Guard Lift	11	-	38.0	1.2%	0.0%	1.3%	3.5	0.0

1st/17th SOS (MC-130)	2	34.3	10.5	0.2%	0.2%	0.3%	5.3	17.2
Gielenkirchen	10	88.3	49.3	1.1%	0.4%	1.6%	4.9	8.8
NATO/AWACS								
Iceland TTF	11	114.9	41.7	1.2%	0.6%	1.4%	3.8	10.4
B-2 Support	2	224.0	8.6	0.2%	1.1%	0.3%	4.3	112.0
Global Power (B-1)	11	1,220.4	30.6	1.2%	6.0%	1.0%	2.8	110.9
ANG 51-Series	1	-	5.7	0.1%	0.0%	0.2%	5.7	0.0
Joint Task Force	10	349.2	41.3	1.1%	1.7%	1.4%	4.1	34.9
Boss Lift	5	13.5	10.4	0.6%	0.1%	0.3%	2.1	2.7
Airstaff Support	7	-	38.0	0.8%	0.0%	1.3%	5.4	0.0
<i>OTHER TOTAL</i>	<i>202</i>	<i>5,052.1</i>	<i>861.0</i>	<i>22.9%</i>	<i>24.6%</i>	<i>28.5%</i>	<i>4.3</i>	<i>25.0</i>
<b>AKANG</b>								
168th Training	83	-	159.9	9.4%	0.0%	5.3%	1.9	0.0
NGB Trips	27	-	63.7	3.1%	0.0%	2.1%	2.4	0.0
AKANG Orientation	2	-	2.7	0.2%	0.0%	0.1%	1.4	0.0
UTA Shuttle	45	-	37.9	5.1%	0.0%	1.3%	0.8	0.0
ESGR	7	-	14.9	0.8%	0.0%	0.5%	2.1	0.0
PDM Inputs	3	8.2	17.0	0.3%	0.0%	0.6%	5.7	2.7
Static Display	5	12.0	10.9	0.6%	0.1%	0.4%	2.2	2.4
Chamber Lift	6	-	21.0	0.7%	0.0%	0.7%	3.5	0.0
Compass Swing/Parts Pickup	6	2.7	15.9	0.7%	0.0%	0.5%	2.7	0.5
<i>AKANG TOTAL</i>	<i>184</i>	<i>22.9</i>	<i>343.9</i>	<i>20.9%</i>	<i>0.1%</i>	<i>11.4%</i>	<i>1.9</i>	<i>0.1</i>
<b>FY97 TOTAL</b>	<b>882</b>	<b>20,504.0</b>	<b>3,024.0</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>3.4</b>	<b>23.2</b>

387 Non A/R sorties (44%) - 495 A/R sorties (56%)

**Table 30. FY96 168 ARW Air Refueling Data**

PACAF	# Sorties	Offload (1,000Lbs)	Hours	% of Total		% of Total		% of Total	
				Sorties	Offload	Hours	Hours/ Sortie	Offload/Sortie (1,000Lbs)	
PACAF 51-Series	108	2,846.7	392.2	12.0%	13.2%	12.3%	3.6	26.4	
Cope Thunder	116	5,117.5	303.2	12.9%	23.7%	9.5%	2.6	44.1	
Coronet West/East	33	1,753.7	220.1	3.7%	8.1%	6.9%	6.7	53.1	
ORE Support	1	24.5	4.6	0.1%	0.1%	0.1%	4.6	24.5	
PACAF Airlift	21	55.9	91.8	2.3%	0.3%	2.9%	4.4	2.7	
Cope North (Japan)	10	330.1	49.4	1.1%	1.5%	1.5%	4.9	33.0	
RIMPAC	7	243.4	34.6	0.8%	1.1%	1.1%	4.9	34.8	
Cope Jade (Thailand)	9	62.8	60.8	1.0%	0.3%	1.9%	6.8	7.0	
Yukon Jack (TD)	9	420.2	39.0	1.0%	1.9%	1.2%	4.3	46.7	
Cobra Gold (Thailand)	17	282.8	69.5	1.9%	1.3%	2.2%	4.1	16.6	
<i>PACAF DIRECTED</i>	<i>331</i>	<i>11,137.6</i>	<i>1,265.2</i>	<i>36.8%</i>	<i>51.6%</i>	<i>39.6%</i>	<i>3.8</i>	<i>33.6</i>	
<b>ANR/11AF</b>									
11AF Combined Forces	2	76.4	8.0	0.2%	0.4%	0.3%	4.0	38.2	
Amalgam Warrior	7	422.7	38.5	0.8%	2.0%	1.2%	5.5	60.4	
Fencing Brave/Spade/Virgo	11	440.6	61.1	1.2%	2.0%	1.9%	5.6	40.1	
354 FW Deployment	2	-	33.9	0.2%	0.0%	1.1%	17.0	0.0	
Distant Frontier	6	257.2	23.5	0.7%	1.2%	0.7%	3.9	42.9	
Civic Leaders	13	-	61.3	1.4%	0.0%	1.9%	4.7	0.0	
11AF Deployment	1	98.2	6.7	0.1%	0.5%	0.2%	6.7	98.2	
<i>ANR/11AF DIRECTED</i>	<i>42</i>	<i>1,295.1</i>	<i>233.0</i>	<i>4.7%</i>	<i>6.0%</i>	<i>7.3%</i>	<i>5.5</i>	<i>30.8</i>	
<i>PACAF TOTAL</i>	<i>373</i>	<i>12,432.7</i>	<i>1,498.2</i>	<i>41.4%</i>	<i>57.6%</i>	<i>46.9%</i>	<i>4.0</i>	<i>33.3</i>	
<b>HHQ</b>									
Busy Relay (RC-135)	20	1,230.3	96.4	2.2%	5.7%	3.0%	4.8	61.5	
RC/WC-135 Operational	9	572.2	46.9	1.0%	2.6%	1.5%	5.2	63.6	
Distant Phoenix (RC-135W)	1	30.0	5.1	0.1%	0.1%	0.2%	5.1	30.0	
Speckled Trout	7	494.7	26.2	0.8%	2.3%	0.8%	3.7	70.7	
Deny Flight (Italy)	20	382.2	114.0	2.2%	1.8%	3.6%	5.7	19.1	
Presidential Support	3	141.5	13.4	0.3%	0.7%	0.4%	4.5	47.2	
E-4 Support	1	102.0	4.6	0.1%	0.5%	0.1%	4.6	102.0	
B-2 Cold Weather	1	79.6	3.5	0.1%	0.4%	0.1%	3.5	79.6	
<i>HHQ TOTAL</i>	<i>62</i>	<i>3,032.5</i>	<i>310.1</i>	<i>6.9%</i>	<i>14.0%</i>	<i>9.7%</i>	<i>5.0</i>	<i>48.9</i>	
<b>OTHER</b>									
ACC 51-Series	13	611.0	54.6	1.4%	2.8%	1.7%	4.2	47.0	
Pacific Express (Rollers)	14	45.1	95.7	1.6%	0.2%	3.0%	6.8	3.2	
Cargo West	47	2,314.9	232.2	5.2%	10.7%	7.3%	4.9	49.3	
Business Effort	54	679.9	169.6	6.0%	3.1%	5.3%	3.1	12.6	
Guard Lift	9	13.0	38.6	1.0%	0.1%	1.2%	4.3	1.4	
Red Flag	14	524.3	37.4	1.6%	2.4%	1.2%	2.7	37.5	

Gielenkirchen	14	162.2	69.8	1.6%	0.8%	2.2%	5.0	11.6
NATO/AWACS								
Iceland TTF	8	205.0	28.5	0.9%	0.9%	0.9%	3.6	25.6
European TTF (England)	14	421.9	83.9	1.6%	2.0%	2.6%	6.0	30.1
Global Power (B-1)	4	452.8	14.7	0.4%	2.1%	0.5%	3.7	113.2
ANG 51-Series	2	199.0	5.9	0.2%	0.9%	0.2%	3.0	99.5
Force Extenders (KC-10)	6	256.7	37.2	0.7%	1.2%	1.2%	6.2	42.8
Silver Bullet Support (KC-10)	1	30.0	3.4	0.1%	0.1%	0.1%	3.4	30.0
Coronet Regatta (B-1)	1	68.4	2.9	0.1%	0.3%	0.1%	2.9	68.4
<i>OTHER TOTAL</i>	<i>201</i>	<i>5,984.2</i>	<i>874.4</i>	<i>22.3%</i>	<i>27.7%</i>	<i>27.4%</i>	<i>4.4</i>	<i>29.8</i>

<b>AKANG</b>								
168th Training	159	-	298.0	17.7%	0.0%	9.3%	1.9	0.0
NGB Trips	8	-	32.4	0.9%	0.0%	1.0%	4.1	0.0
UTA Shuttle	57		49.1	6.3%	0.0%	1.5%	0.9	0.0
ESGR	18	118.4	2.5	2.0%	0.5%	2.0%	3.5	6.6
PDM Pickup	3	-	15.2	0.3%	0.0%	0.5%	5.1	0.0
Static Display	2	-	1.6	0.2%	0.0%	0.1%	0.8	0.0
Chamber Lift	13	32.3	41.0	1.4%	0.1%	1.3%	3.2	2.5
Compass Swing	4	-	12.2	0.4%	0.0%	0.4%	3.1	0.0
<i>AKANG TOTAL</i>	<i>264</i>	<i>150.7</i>	<i>512.0</i>	<i>29.3%</i>	<i>0.7%</i>	<i>16.0%</i>	<i>1.9</i>	<i>0.6</i>

<b>FY96 TOTAL</b>	<b>900</b>	<b>21,600.1</b>	<b>3,194.7</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>3.5</b>	<b>24.0</b>
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379 Non A/R sorties (42%) - 521 A/R sorties (58%)



**Table 31. FY95 168 ARW Air Refueling Data**

				% of Total	% of Total	% of Total		
PACAF	# Sorties	Offload (1,000Lbs)	Hours	Sorties	Offload	Hours	Hours/ Sortie	Offload/Sortie (1,000Lbs)
PACAF 51-Series	166	4,071.6	665.9	20.4%	23.6%	24.1%	4.0	24.5
Cope Thunder	81	4,108.6	199.7	9.9%	23.8%	7.2%	2.5	50.7
Coronet West/East	39	1,425.8	181.7	4.8%	8.3%	6.6%	4.7	36.6
ORI Support	16	517.8	48.4	2.0%	3.0%	1.7%	3.0	32.4
Coronet Federation	4	78.7	30.5	0.5%	0.5%	1.1%	7.6	19.7
PACAF Airlift	18	63.5	71.5	2.2%	0.4%	2.6%	4.0	3.5
Pacific Band Lift	7	9.3	31.9	0.9%	0.1%	1.2%	4.6	1.3
Tandem Thrust	3	147.0	15.9	0.4%	0.9%	0.6%	5.3	49.0
Midnight Sands	1	48.3	4.1	0.1%	0.3%	0.1%	4.1	48.3
<i>PACAF DIRECTED</i>	<i>335</i>	<i>10,470.6</i>	<i>1,249.6</i>	<i>41.1%</i>	<i>60.7%</i>	<i>45.2%</i>	<i>3.7</i>	<i>31.3</i>
<b>ANR/11AF</b>								
OPLAN 3115	2	109.0	12.6	0.2%	0.6%	0.5%	6.3	54.5
Amalgam Warrior	9	369.2	40.6	1.1%	2.1%	1.5%	4.5	41.0
Fencing Brave/Spade/Virgo	8	324.5	42.5	1.0%	1.9%	1.5%	5.3	40.6
Force Projection	1	46.6	6.8	0.1%	0.3%	0.2%	6.8	46.6
Northern Pike	3	238.8	11.9	0.4%	1.4%	0.4%	4.0	79.6
Killer Scout	1	45.0	1.6	0.1%	0.3%	0.1%	1.6	45.0
<i>ANR/11AF DIRECTED</i>	<i>24</i>	<i>1,133.1</i>	<i>116.0</i>	<i>2.9%</i>	<i>6.6%</i>	<i>4.2%</i>	<i>4.8</i>	<i>47.2</i>
<i>PACAF TOTAL</i>	<i>359</i>	<i>11,603.7</i>	<i>1,365.6</i>	<i>44.0%</i>	<i>67.2%</i>	<i>49.4%</i>	<i>3.8</i>	<i>32.3</i>
<b>HHQ</b>								
Busy Relay	13	738.4	70.1	1.6%	4.3%	2.5%	5.4	56.8
RC/WC-135 Operational	16	943.8	101.9	2.0%	5.5%	3.7%	6.4	59.0
Distant Phoenix	2	122.7	9.3	0.2%	0.7%	0.3%	4.7	61.4
Phoenix Flipper	1	70.0	4.4	0.1%	0.4%	0.2%	4.4	70.0
2nd SOC/EC-137	1	114.0	3.0	0.1%	0.7%	0.1%	3.0	114.0
E-4 Support	2	207.0	9.2	0.2%	1.2%	0.3%	4.6	103.5
Southern Watch	5	-	25.2	0.6%	0.0%	0.9%	5.0	0.0
<i>HHQ TOTAL</i>	<i>40</i>	<i>2,195.9</i>	<i>223.1</i>	<i>4.9%</i>	<i>12.7%</i>	<i>8.1%</i>	<i>5.6</i>	<i>54.9</i>
<b>OTHER</b>								
AMC 51-Series	11	299.1	46.9	1.3%	1.7%	1.7%	4.3	27.2
Pacific Express	12	8.0	65.9	1.5%	0.0%	2.4%	5.5	0.7
ACC 51-Series	24	1,185.9	86.5	2.9%	6.9%	3.1%	3.6	49.4
Business Effort	34	801.1	141.0	4.2%	4.6%	5.1%	4.1	23.6
Guard Lift	10	-	40.9	1.2%	0.0%	1.5%	4.1	0.0
Red Flag	25	612.9	89.3	3.1%	3.6%	3.2%	3.6	24.5
Gielenkirchen	8	152.9	34.5	1.0%	0.9%	1.2%	4.3	19.1
NATO/AWACS								
Iceland TTF	8	149.4	31.2	1.0%	0.9%	1.1%	3.9	18.7

Sentry Aloha	4	15.8	13.9	0.5%	0.1%	0.5%	3.5	4.0
Tactics Weapons School	1	93.0	4.9	0.1%	0.5%	0.2%	4.9	93.0
B-1 Speed Record	2	90.1	9.3	0.2%	0.5%	0.3%	4.7	45.1
<i>OTHER TOTAL</i>	<i>139</i>	<i>3,408.2</i>	<i>564.3</i>	<i>17.1%</i>	<i>19.8%</i>	<i>20.4%</i>	<i>4.1</i>	<i>24.5</i>

**AKANG**

168th Training	258	-	519.8	31.7%	0.0%	18.8%	2.0	0.0
R-Model Conversion	11	31.5	63.9	1.3%	0.2%	2.3%	5.8	2.9
ESGR	8	16.6	30.2	1.0%	0.1%	1.1%	3.8	2.1
<i>AKANG TOTAL</i>	<i>277</i>	<i>48.1</i>	<i>613.9</i>	<i>34.0%</i>	<i>0.3%</i>	<i>22.2%</i>	<i>2.2</i>	<i>0.2</i>

<b>FY95 TOTAL</b>	<b>815</b>	<b>17,255.9</b>	<b>2,766.9</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>3.4</b>	<b>21.2</b>
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**Table 32. FY94 168 ARW Air Refueling Data**

				% of Total	% of Total	% of Total		
PACAF	# Sorties	Offload (1,000Lbs)	Hours	Sorties	Offload	Hours	Hours/ Sortie	Offload/Sortie (1,000Lbs)
PACAF 51-Series	143	3,495.7	533.6	15.5%	21.1%	17.4%	3.7	24.4
Cope Thunder	95	3,654.9	282.5	10.3%	22.0%	9.2%	3.0	38.5
Coronet West/East	15	510.6	61.1	1.6%	3.1%	2.0%	4.1	34.0
PACAF IG Support	14	-	65.0	1.5%	0.0%	2.1%	4.6	0.0
PACAF Airlift	32	44.7	92.2	3.5%	0.3%	3.0%	2.9	1.4
<i>PACAF DIRECTED</i>	<i>299</i>	<i>7,705.9</i>	<i>1,034.4</i>	<i>32.5%</i>	<i>46.5%</i>	<i>33.8%</i>	<i>3.5</i>	<i>25.8</i>
<b>ANR/11AF</b>								
OPLAN 3115	4	153.7	18.8	0.4%	0.9%	0.6%	4.7	38.4
Amalgam Warrior	13	772.4	62.5	1.4%	4.7%	2.0%	4.8	59.4
Fencing Brave/Spade/Virgo	10	390.7	59.5	1.1%	2.4%	1.9%	6.0	39.1
Polar Thrust	19	442.4	72.0	2.1%	2.7%	2.4%	3.8	23.3
ORI Support	25	535.6	101.8	2.7%	3.2%	3.3%	4.1	21.4
Northern Edge	15	619.4	58.9	1.6%	3.7%	1.9%	3.9	41.3
11AF Lore Support	17	441.1	66.8	1.8%	2.7%	2.2%	3.9	25.9
Civic Leaders	15	-	63.8	1.6%	0.0%	2.1%	4.3	0.0
Air Evacuation	2	-	1.5	0.2%	0.0%	0.0%	0.8	0.0
<i>ANR/11AF DIRECTED</i>	<i>120</i>	<i>3,355.3</i>	<i>505.6</i>	<i>13.0%</i>	<i>20.2%</i>	<i>16.5%</i>	<i>4.2</i>	<i>28.0</i>
<i>PACAF TOTAL</i>	<i>419</i>	<i>11,061.2</i>	<i>1,540.0</i>	<i>45.5%</i>	<i>66.7%</i>	<i>50.3%</i>	<i>3.7</i>	<i>26.4</i>
<b>HHQ</b>								
Busy Relay	26	1738.2	117.9	2.8%	10.5%	3.9%	4.5	66.9
RC/WC-135 Operational	15	723.2	83.1	1.6%	4.4%	2.7%	5.5	48.2
Global Power	1	75.0	4.1	0.1%	0.5%	0.1%	4.1	75.0
EC-137/NKC-135 Support	2		6.5	0.2%	0.7%	0.2%	3.3	61.4
		122.8						
EC-130 Support	1	29.6	6.3	0.1%	0.2%	0.2%	6.3	29.6
<i>HHQ TOTAL</i>	<i>45</i>	<i>2,688.8</i>	<i>217.9</i>	<i>4.9%</i>	<i>16.2%</i>	<i>7.1%</i>	<i>4.8</i>	<i>59.8</i>
<b>OTHER</b>								
Force Extender	16	587.5	75.1	1.7%	3.5%	2.5%	4.7	36.7
ACC 51-Series	12	567.3	55.5	1.3%	3.4%	1.8%	4.6	47.3
ANG 51-Series	2	16.0	5.5	0.2%	0.1%	0.2%	2.8	8.0
RC-135 Trainer (PASY)	2	95.0	11.1	0.2%	0.6%	0.4%	5.6	47.5
Business Effort	10	383.1	17.8	1.1%	2.3%	0.6%	1.8	38.3
Guard Lift	18	-	68.7	2.0%	0.0%	2.2%	3.8	0.0
Air War College	10	-	48.5	1.1%	0.0%	1.6%	4.9	0.0
Balance Torch	10	65.7	53.6	1.1%	0.4%	1.8%	5.4	6.6
Green Flag	18	369.4	67.7	2.0%	2.2%	2.2%	3.8	20.5
Distant Frontier	4	149.4	11.8	0.4%	0.9%	0.4%	3.0	37.4
MINEX	11	2.8	55.8	1.2%	0.0%	1.8%	5.1	0.3
Iceland TTF	6	169.7	23.7	0.7%	1.0%	0.8%	4.0	28.3

Gielenkirchen	8	234.0	32.9	0.9%	1.4%	1.1%	4.1	29.3
NATO/AWACS								
1st SOS	3	67.3	15.3	0.3%	0.4%	0.5%	5.1	22.4
<i>OTHER TOTAL</i>	<i>130</i>	<i>2,707.2</i>	<i>543.0</i>	<i>14.1%</i>	<i>16.3%</i>	<i>17.7%</i>	<i>4.2</i>	<i>20.8</i>
<b>AKANG</b>								
168th Training	287	-	585.8	31.2%	0.0%	19.1%	2.0	0.0
Airshows	2	55.0	15.1	0.2%	0.3%	0.5%	7.6	27.5
HQAKANG Support	13	26.0	55.0	1.4%	0.2%	1.8%	4.2	2.0
A/R Pump Modification	11	14.1	56.6	1.2%	0.1%	1.8%	5.1	1.3
PDM Input	8	-	39.4	0.9%	0.0%	1.3%	4.9	0.0
ESGR	5	36.5	8.1	0.5%	0.2%	0.3%	1.6	7.3
<i>AKANG TOTAL</i>	<i>326</i>	<i>131.6</i>	<i>760.0</i>	<i>35.4%</i>	<i>0.8%</i>	<i>24.8%</i>	<i>2.3</i>	<i>0.4</i>
<b>FY94 TOTAL</b>	<b>920</b>	<b>16,588.8</b>	<b>3,060.9</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>3.3</b>	<b>18.0</b>

**Table 33. FY93 168 ARW Air Refueling Data**

				% of Total	% of Total	% of Total		
PACAF	# Sorties	Offload (1,000Lbs)	Hours	Sorties	Offload	Hours	Hours/ Sortie	Offload/Sortie (1,000Lbs)
PACAF 51-Series	155	4,879.4	560.4	15.7%	24.6%	17.8%	3.6	31.5
Cope Thunder	139	3,651.4	278.0	14.1%	18.4%	8.8%	2.0	26.3
Coronet West/East	18	777.9	115.5	1.8%	3.9%	3.7%	6.4	43.2
Hurricane Iniki	4	-	12.6	0.4%	0.0%	0.4%	3.2	0.0
PACAF Airlift	34	47.5	136.5	3.4%	0.2%	4.3%	4.0	1.4
Pacific Band Lift	6	-	25.3	0.6%	0.0%	0.8%	4.2	0.0
Tandem Thrust	1	65.7	6.1	0.1%	0.3%	0.2%	6.1	65.7
Team Spirit	34	1,644.4	141.1	3.4%	8.3%	4.5%	4.2	48.4
<i>PACAF DIRECTED</i>	<i>391</i>	<i>11,066.3</i>	<i>1,275.5</i>	<i>39.6%</i>	<i>55.9%</i>	<i>40.5%</i>	<i>3.3</i>	<i>28.3</i>
<b>ANR/11AF</b>								
OPLAN 3115	10	491.4	43.8	1.0%	2.5%	1.4%	4.4	49.1
Amalgam Warrior	10	398.6	44.5	1.0%	2.0%	1.4%	4.5	39.9
Fencing Brave/Spade/Virgo	3	84.0	13.2	0.3%	0.4%	0.4%	4.4	28.0
Polar Thrust	4	103.8	31.4	0.4%	0.5%	1.0%	7.9	26.0
Quick Force	7	192.8	27.5	0.7%	1.0%	0.9%	3.9	27.5
343rd Deployment	5	62.5	24.0	0.5%	0.3%	0.8%	4.8	12.5
<i>ANR/11AF DIRECTED</i>	<i>39</i>	<i>1,333.1</i>	<i>184.4</i>	<i>3.9%</i>	<i>6.7%</i>	<i>5.9%</i>	<i>4.7</i>	<i>34.2</i>
<i>PACAF TOTAL</i>	<i>430</i>	<i>12,399.4</i>	<i>1,459.9</i>	<i>43.5%</i>	<i>62.6%</i>	<i>46.4%</i>	<i>3.4</i>	<i>28.8</i>
<b>HHQ</b>								
Busy Relay	31	575.4	57.0	3.1%	2.9%	1.8%	1.8	18.6
RC/WC-135 Operational	12	451.2	74.8	1.2%	2.3%	2.4%	6.2	37.6
RC-135 (Hawaii)	4	114.3	23.1	0.4%	0.6%	0.7%	5.8	28.6
Global Cruise	4	158.1	12.0	0.4%	0.8%	0.4%	3.0	39.5
EC-137 Support	1	71.8	5.6	0.1%	0.4%	0.2%	5.6	71.8
E-4 Support	5	154.5	9.1	0.5%	0.8%	0.3%	1.8	30.9
Restore Hope	7	60.0	19.2	0.7%	0.3%	0.6%	2.7	8.6
Provide Comfort	5	-	28.7	0.5%	0.0%	0.9%	5.7	0.0
EC-130 Support	3	97.8	21.1	0.3%	0.5%	0.7%	7.0	32.6
<i>HHQ TOTAL</i>	<i>72</i>	<i>1,683.1</i>	<i>250.6</i>	<i>7.3%</i>	<i>8.5%</i>	<i>8.0%</i>	<i>3.5</i>	<i>23.4</i>
<b>OTHER</b>								
Volant Boom	68	2,875.3	334.6	6.9%	14.5%	10.6%	4.9	42.3
Volant Pump	11	816.2	47.6	1.1%	4.1%	1.5%	4.3	74.2
ACC 51-Series	8	189.1	29.7	0.8%	1.0%	0.9%	3.7	23.6
ANG 51-Series	4	26.2	12.3	0.4%	0.1%	0.4%	3.1	6.6
RC-135 Trainer (PASY)	10	277.0	60.4	1.0%	1.4%	1.9%	6.0	27.7
Business Effort	19	241.8	68.9	1.9%	1.2%	2.2%	3.6	12.7
Guard Lift	17	83.6	56.5	1.7%	0.4%	1.8%	3.3	4.9
Academy Airlift	7	-	24.8	0.7%	0.0%	0.8%	3.5	0.0

HANG Support	16	91.3	40.9	1.6%	0.5%	1.3%	2.6	5.7
Force Extend	4	179.5	25.0	0.4%	0.9%	0.8%	6.3	44.9
Ready Norseman	22	359.2	68.4	2.2%	1.8%	2.2%	3.1	16.3
Coronet Night Hawk	10	166.6	45.5	1.0%	0.8%	1.4%	4.6	16.7
Gielenkirchen	16	266.5	79.5	1.6%	1.3%	2.5%	5.0	16.7
NATO/AWACS								
7th Fleet Support	2	48.8	10.5	0.2%	0.2%	0.3%	5.3	24.4
<i>OTHER TOTAL</i>	<i>214</i>	<i>5,621.1</i>	<i>904.6</i>	<i>21.7%</i>	<i>28.4%</i>	<i>28.7%</i>	<i>4.2</i>	<i>26.3</i>
<b>AKANG</b>								
168th Training	239	-	409.1	24.2%	0.0%	13.0%	1.7	0.0
Airshows	5	23.3	16.9	0.5%	0.1%	0.5%	3.4	4.7
HQAKANG Support	14	30.0	50.4	1.4%	0.2%	1.6%	3.6	2.1
Compass Swing	3	-	8.3	0.3%	0.0%	0.3%	2.8	0.0
PDM Input	7	52.6	36.4	0.7%	0.3%	1.2%	5.2	7.5
ESGR	4	-	13.2	0.4%	0.0%	0.4%	3.3	0.0
<i>AKANG TOTAL</i>	<i>272</i>	<i>105.9</i>	<i>534.3</i>	<i>27.5%</i>	<i>0.5%</i>	<i>17.0%</i>	<i>2.0</i>	<i>0.4</i>
<b>FY93 TOTAL</b>	<b>988</b>	<b>19,809.5</b>	<b>3,149.4</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>3.2</b>	<b>20.1</b>

## Appendix B: Major Alaskan-based Exercise Participants

**Table 34. Amalgam Warrior 1998 Exercise Participants**

NORAD EXERCISE							
3-5 NOVEMBER 1997							
UNIT TASKED	AIRCRAFT	#	SORTIES		BEDS		HOME BASE
			AM	PM	EIL	ELM	
Scheduled							
at Eielson							
119 FW/178 FS	F-16(15)	6	4		86		Hector IAP/Fargo, ND
7 BW/9 BS	B-1B	6	5		140		Dyess AFB, TX
27 FW/429 ECS	EF-111	3	2		52		Cannon AFB, NM
Civilian	Lear 35	4	(fly from Inuvick)				Hector IAP/Fargo, ND
168 ARS	KC-135R	3	3				Eielson AFB, AK
CAF	T-33	CNX	(fly from King Salmon)				
total at Eielson		22	14	0	278		
at Elmendorf							
3 WG/962 AACs	E-3C	1					Elmendorf AFB
118 AW/105 AS	C-130	3				60	Nashville, TN
305 AMW	KC-10	1				40	McGuire AFB, NJ
total at Elmendorf			0	0		100	
Total Scheduled		22	14	0	278	100	
TOTAL SORTIES			14	0			
MAX SORTIES ALLOWED			150				
TOTAL BEDS					278	100	
MAX BEDS AVAILABLE					750	514	

**Table 35. Cope Thunder 1998 – 1 Exercise Participants**

NIGHT HIGH-TECH/CAS							
19 FEBRUARY-6 MARCH 1998							
NORTHERN EDGE DATES: 17 FEB-6 MAR 98							
UNIT TASKED	AIRCRAFT	#	SORTIES		BEDS		HOME BASE
			AM	PM	EIL	ELM	
<b>Scheduled</b>							
<b>at Eielson</b>							
51 FW/36 FS	F-16 (40)	CNX					Osan AB
354 FW/18 FS	F-16 (40)	CNX					Eielson AFB
354 FW/355FS	A/OA -10	12	10	10			Eielson AFB
VAQ-141	EA-6B	CNX					Whidbey Island NAS, WA
168 ARW	KC-135R	2	2	1			Eielson AFB
18 WG/909 ARS	KC-135R	CNX					Kadena AB
155 ARW/ANG	KC-135R	CNX					Lincoln MAP, NE
210 RQS	HC-130	2			65		Kulis ANGB
210 RQS	HH-60	3					▪
Total at Eielson		19	12	11	65		
<b>at Elmendorf</b>							
3 WG/90 FS	F-15E	CNX					Elmendorf AFB
18 WG/44 FS	F-15C	CNX					Kadena AB
18 WG/961 AACS	E-3C	CNX					Kadena AB
3 WG/962 AACS	E-3C	1	0	1			Elmendorf AFB
305 AMW	KC-10	2	1	1		40	McGuire AFB
3 WG/517 AS	C-130H	4	3	3			Elmendorf AFB
176 AG/144 AS	C-130H	4	3	3			Kulis ANGB
62 AW	C-141	4	4	0		75	McChord AFB
Total at Elmendorf			11	8		115	
Total Scheduled		19	23	19	65	115	
<i>Units in bold italics are NE only participants</i>							
<b>Other</b>							
381 IS	Opsec/Comsec				12		Elmendorf AFB
MPC					5		Eielson AFB
JAOC							Elmendorf AFB
76 SOPS	Space Support				3	2	Falcon AFB, CO
National System Support					2		
PACAF Munitions Techs.					6		
3 ASOS	TACP						Ft. Wainwright
111 ASOC	ASOC				20		Camp Murray, WA
623 ACS	GCI					5	Kadena AB
615 AMS	TALCE	billeted at Ft. Wainwright					Travis AFB
176 APS	Aerial Port	billeted at Ft. Greely					Kulis ANGB
622 AMOG	AME					35	McGuire AFB
22 STS	CCT	billeted at Ft. Greely					McChord AFB, WA
TOTAL SORTIES			23	19			
MAX SORTIES ALLOWED			150				
TOTAL BEDS					113	157	
MAX BEDS AVAILABLE					750	514	



**Table 36. Cope Thunder 1998 – 2 Exercise Participants**

INTERDICTION							
30 APRIL-15 MAY 1998							
UNIT TASKED	AIRCRAFT	#	SORTIES		BEDS		HOME BASE
			AM	PM	EIL	ELM	
<b>Scheduled</b>							
<b>at Eielson</b>							
8 FW/35 FS	F-16(30)	6	4	4	142		Kunsan AB
115 FW/176 FS	F-16(30)	8	6	6	125		Truax Fld. Madison, WI
132 FW/124 FS	F-16(42)	8	6	6	125		Des Moines IAP, IA
168 ARW	KC-135R	2	2	1			Eielson AFB
18 WG/909 ARS	KC-135R	2	1	2	52		Kadena AFB
101 ARW/ANG	KC-135E	1	1	1	24		Bangor IAP, ME
108 ARW/ANG	KC-135E	1	1	1	21		McGuire AFB, NJ
157 ARW/ANG	KC-135R	2	1	1	21		Pease ANGB, NH
<b>total at Eielson</b>		<b>30</b>	<b>22</b>	<b>22</b>	<b>510</b>		
<b>at Elmendorf</b>							
18 WG/67 FS	F-15C	12	10	8		219	Kadena AB
VMFA-224	F/A-18C	<b>CNX</b>					Beaufort MCAS, SC
VAQ-133	EA-6B	4	3	3		108	Whidbey Island, NAS
169 IS	Senior Scout					39	Salt Lake City, UT
124 FW/189 AS	C-130	1	1	0		28	Boise, ID
18 WG/961 AACS	E-3C	1	1	0		70	Kadena AB
3 WG/962 AACS	E-3C	1	0	1			Elmendorf AFB
355 WG/43 ECS	EC-130H	<b>CNX</b>					Davis-Monthan AFB, AZ
<b>Total at Elmendorf</b>		<b>19</b>	<b>15</b>	<b>12</b>		<b>464</b>	
<b>Total Scheduled</b>		<b>49</b>	<b>37</b>	<b>34</b>	<b>510</b>	<b>464</b>	
<b>Other</b>							
210 RQS	HH-60				5		Kulis ANGB
381 IS	Opsec/Comsec				12		Elmendorf AFB
SMO	Nat'l Syst. Support				2		
76 SOPS	Space Support				3	2	Falcon AFB, CO
MPC					3		Eielson AFB
JAOC						5	Elmendorf AFB
611 ACS /623 ACS	GCI					6	Elmendorf / Kadena
<b>TOTAL SORTIES</b>			<b>37</b>	<b>34</b>			
<b>MAX SORTIES ALLOWED</b>			<b>150</b>				
<b>TOTAL BEDS</b>					<b>535</b>	<b>477</b>	
<b>MAX BEDS AVAILABLE</b>					<b>750</b>	<b>514</b>	

**Table 37. Cope Thunder 1998 – 3 Exercise Participants**

INTERDICTION							
4-19 JUNE 1998							
UNIT TASKED	AIRCRAFT	#	SORTIES		BEDS		HOME BASE
			AM	PM	EIL	ELM	
<u>Scheduled</u>							
<u>At Eielson</u>							
8 FW/80 FS	F-16 (30)	12	10	10	178		Kunsan AB
113 FW/121 FS	F-16(30)	10	8	8	180		Andrews AFB, MD
178 FW/162 FS	F-16(30)	8	6	6	135		Springfield , OH
111(F) SQN/RAF	F-3	8	6	6	off base		RAF Leuchars
101 SQN/RAF	VC-10	2	1	1	off base		RAF Brize-Norton
168 ARW	KC-135R	2	2	1			Eielson AFB
18 WG/909 ARS	KC-135R	2	1	2	34		Kadena AB
154 WG/203 ARS	KC-135R	1	1	1	21		Hickam AFB, HI
108 ARW/ANG	KC-135E	1	1	1	21		McGuire AFB, NJ
171 ARW/ANG	KC-135E	1	1	1	21		Pittsburgh, PA
<b>total at Eielson</b>		<b>47</b>	<b>37</b>	<b>37</b>	<b>590</b>		
<u>at Elmendorf</u>							
3 WG/54 FS	F-15C	10	8	8			Elmendorf AFB
VMFA-112	F-18A	8	6	6		160	NAS Ft. Worth JRB
VMFA-242	F-18D	8	6	6		180	Miramar MCAS, CA
VMGR-234	KC-130	3	2	2		50	NAS Ft. Worth JRB
VMGR-352	KC-130	2	2	2		40	El Toro MCAS, CA
47 (SF) SQN/RAF	C-130	2	1	1	off base		RAF Lyneham
3 WG/962 AACS	E-3C	1	1	0			Elmendorf AFB
VMAQ-3	EA-6B	<b>CNX</b>					Cherry Point MCAS, NC
VAQ-128	EA-6B	<b>CNX</b>					Whidbey Island NAS, WA
<b>total at Elmendorf</b>		<b>34</b>	<b>26</b>	<b>25</b>		<b>430</b>	
<b>Total Scheduled</b>		<b>81</b>	<b>63</b>	<b>62</b>	<b>590</b>	<b>430</b>	
<u>Other</u>							
210 RQS	HH-60				5		Kulis ANGB
4th LAAD/USMCR	Stingers	stay in the field			42		Pasadena, CA
381 IS	Opsec/Comsec				14		Eielson AFB
76 SOPS	Space Support				3	2	Falcon AFB, CO
MPC					4		Eielson AFB
RAF Permanent Party					110		Eielson AFB
JAOC						4	Elmendorf AFB
178 FW/123 ACS	GCI					6	Blue Ash Station, OH
611 ACS	GCI						Elmendorf AFB
<b>TOTAL SORTIES</b>			<b>63</b>	<b>62</b>			
<b>MAX SORTIES ALLOWED</b>			<b>150</b>				
<b>TOTAL BEDS</b>					<b>768</b>	<b>442</b>	
<b>MAX BEDS AVAILABLE</b>					<b>750</b>	<b>474</b>	

**Table 38. Distant Frontier 1998 Exercise Participants**

RAF EXERCISE							
22 JUNE-8							
JULY							
UNIT TASKED	AIRCRAFT	#	SORTIES		BEDS		HOME BASE
			AM	PM	EIL	ELM	
<u>Scheduled</u>							
<u>at Eielson</u>							
43 SQN/RAF	F-3	9	8	8	110		RAF Leuchars
54 SQN/RAF	GR-1/Jaguar	10	8	8	110		RAF Coltishall
101 SQN/RAF	VC-10	2	1	1	33		RAF Brize-Norton
47 (SF) SQN/RAF	C-130	2	1	1	65		RAF Lyneham
305 RQS	HH-60	3	2	2	190		Davis-Monthan AFB, AZ
total at Eielson		26	20	20	508		
<u>at Elmendorf</u>							
8 SQN/RAF	E-3D	1	0	1	off base		RAF Waddington
total at Elmendorf		1	0	1		0	
Total Scheduled		4	2	3	190	0	
<u>Other</u>							
RAF Permanent Party					90		Eielson AFB
TOTAL SORTIES			2	3			
MAX SORTIES ALLOWED			150				
TOTAL BEDS					280	0	
MAX BEDS AVAILABLE					750	540	

**Table 39. Cope Thunder 1998 – 4 Exercise Participants**

INTERDICTION/CAS/CSAR/AIRLIFT							
9-24 JULY 1998							
UNIT TASKED/SCHEDULED	AIRCRAFT	#	SORTIES		BEDS		HOME BASE
			AM	PM	EIL	ELM	
<u>at Eielson</u>							
354 FW/355 FS	A/OA -10	12	10	10			Eielson AFB
175 WG/104 FS	A/OA -10	8	6	6	130		Baltimore, MD
150 FW/188 FS	F-16 (40)	6	4	4	100		Albuquerque, NM
120 FW/186 FS	F-16 (15)	CNX					Great Falls IAP, MT
122 FW/163 FS	F-16 (25)	8	6	6	109		Fort Wayne IAP, IN
6 SQN/RAF	GR-1/Jaguar	10	8	8	off base		RAF Coltishall
81 WG/RAAF	F-18C	6	6	4	70		Williamtown, Aus.
101 SQN/RAF	VC-10	2	1	1	off base		RAF Brize-Norton
84 WG/RAAF	KC-135	1	1	1	27		Williamtown, Aus.
168 ARW	KC-135R	2	2	1			Eielson AFB
18 WG/909 ARS	KC-135R	2	1	2	45		Kadena AB
154 WG/203 ARS	KC-135R	1	1	1	21		Hickam AFB, HI
121 ARW/ANG	KC-135R	1	1	1	21		Columbus, OH
151 ARW/ANG	KC-135E	1	1	1	21		Salt Lake City IAP, UT
190 ARW/ANG	KC-135E	1	1	1	21		Forbes Fld/Topeka, KS
51 SQN/RAF	Nimrod R	1	1	0	off base		RAF Waddington
HCS-4	HH-60	3	2	2	75		NAS Oceana, VA
Total at Eielson		65	52	49	640		
<u>At Elmendorf</u>							
3 WG/19 FS	F-15C	8	4	4			Elmendorf AFB
18 WG/12 FS	F-15C	12	4	4		220	Kadena AB
VMFA-533	F/A-18D	CNX					Beaufort MCAS, SC
3 WG/517 AS	C-130H	8	6	0			Elmendorf AFB
1 TAW/JASDF	C-130	3	3	0		64	Komacki AB, Japan
122 SQN/RSAF	C-130	1	1	1		37	Paya Lebar, Singapore
47 (SF) SQN/RAF	C-130	2	2	2	off base		RAF Lyneham
3 WG/962 AACs	E-3C	1	1	0			Elmendorf AFB
23 SQN/RAF	E-3D	1	1	1	off base		RAF Waddington
VMAQ-1	EA-6B	CNX					Cherry Point MCAS
Total at Elmendorf		16	18	8		321	
Total Scheduled		81	70	57	640	321	
<u>Other</u>							
22 STS	CCT	(3 at Ft Greely)			3		McChord AFB, WA
25 ASOS	TACP	(In the field)			1		Wheeler AAF, HI
111 ASOC	ASOC				10		Camp Murray, WA
JASDF	Stingers				23		
JASDF	Observers				5		
210 RQS	HH-60				5		Kulis ANGB
381 IS	Opsec/Comsec				7		Elmendorf AFB
ADF					2		
76 SOPS	Space Support					2	Falcon AFB, CO
MPC					6		Eielson AFB
RAF Permanent Party					105		Eielson AFB
JAOC						5	Elmendorf AFB
623 ACS	GCI					6	Kadena AB
611 ACS	GCI						Elmendorf AFB
TOTAL SORTIES			70	57			
MAX SORTIES ALLOWED			150				
TOTAL BEDS					807	334	
MAX BEDS AVAILABLE					750	564	

**Table 40. Amalgam Warrior 1997 Exercise Participants**

22-24 APRIL 97

<u>UNIT TASKED</u>	<u>AIRCRAFT</u>	#	<u>SORTIES</u>		<u>BEDS</u>		<u>HOME BASE</u>
			<u>AM</u>	<u>PM</u>	<u>EIL</u>	<u>ELM</u>	
<b>Scheduled</b>							
<b><u>at Eielson</u></b>							
119 FW/178 FS	CNX						Hector IAP/Fargo, ND
7 WG/9 BS	B-1B	3			60		Dyess AFB, TX
184 BW/127 BS	B-1B	3			60		McConnell AFB, KS
366 AEW/34 BS	B-1B	3			93		Mountain Home AFB, ID
305 AMW	KC-10	1			40		McGuire AFB, NJ
168 ARW	KC-135	3					Eielson AFB
Civilian	Lear 35	4					Hector IAP/Fargo, ND
CAF/434 SQN	CC-144	2			17		Greenwood, NS Canada
<b>Total at Eielson</b>		19	0	0	270		
<b><u>at Elmendorf</u></b>							
355 WG/43 ECS	EC-130	2				90	Davis-Monthan AFB, AZ
Civilian	NKC-135	1					Kirkland AFB, NM
3 WG	F-15C	12					Elmendorf AFB
3 WG/962 AACS	E-3C	1					Elmendorf AFB
<b>Total at Elmendorf</b>			0	0		90	
<b>Total Scheduled</b>		19	0	0	270	90	
<b>TOTAL SORTIES</b>			0	0			
<b>MAX SORTIES ALLOWED</b>			150				
<b>TOTAL BEDS</b>					270	90	
<b>MAX BEDS AVAILABLE</b>					750	535	

**Table 41. Cope Thunder 1997 – 1 Exercise Participants**

NIGHT/INTERDICTION							
6-21 MARCH 1997							
UNIT TASKED	AIRCRAFT	SORTIES			BEDS		HOME BASE
		#	AM	PM	EIL	ELM	
<b>Scheduled</b>							
<b><u>at Eielson</u></b>							
354 FW/18 FS	F-16 (40)	14	12	12			Eielson AFB
168 ARW	KC-135	2	2	2			Eielson AFB
163 ARW/ANG	KC-135	1	1	1	23		March AFB, CA
176 AG/210 RQS	HH-60	3	0	2	30		Kulis ANGB
<b>Total at Eielson</b>		20	15	17	53		
<b><u>at Elmendorf</u></b>							
3 WG/54 FS	F-15C	6	4	4			Elmendorf AFB
3 WG/90 FS	F-15E	10	8	8			Elmendorf AFB
VMAQ-1	EA-6B	2	2	1		139	MCAS Cherry Point
3 WG/962 AACS	E-3C	1	1	1			Elmendorf AFB
176 AG/210 RQS	HC-130	1	0	1			Kulis ANGB
<b>Total at Elmendorf</b>			15	15		139	
<b>Total Scheduled</b>		20	30	32	53	139	
<b><u>Other</u></b>							
76 SOPS	Space Supp				2	2	Falcon AFB, CO
DET 460	Comm Jam				9		Eielson AFB
MPC						2	Elmendorf AFB
JAOC						2	Elmendorf AFB
611 ACS	GCI					5	Elmendorf AFB
<i>NE Players</i>					71	368	
<b>TOTAL SORTIES</b>			30	32			
<b>MAX SORTIES ALLOWED</b>			150				
<b>TOTAL BEDS</b>					135	518	
<b>MAX BEDS AVAILABLE</b>					745	502	

**Table 42. Northern Edge 1997 Exercise Participants**

14-26 MARCH 1997							
UNIT TASKED	AIRCRAFT	SORTIES			BEDS		HOME BASE
		#	AM	PM	EIL	ELM	
Scheduled							
at Eielson							
354 FW/355 FS	A/OA-10	4					Eielson AFB
22 ARW	KC-135	2			60		McConnell AFB, KS
TALCE/APS					11		Dyess AFB, TX
Total at Eielson		6	0	0	71		
At Elmendorf							
305 AMW	KC-10	2				60	McGuire AFB
3 WG/517 AS	C-130	4	3	0			Elmendorf AFB
374 AW/36 AS	C-130	4				120	Yakota AB
62 AW	C-141	6				80	McChord AFB
TALCE						38	Dyess AFB
APS						30	McChord AFB
AME						40	Travis AFB
Total at Elmendorf			0	0		368	
Total Scheduled		6	0	0	71	368	
TOTAL SORTIES			0	0			
MAX SORTIES ALLOWED			150				
TOTAL BEDS					71	368	
MAX BEDS AVAILABLE					750	535	

**Table 43. Cope Thunder 1997 – 2 Exercise Participants**

INTERDICTION							
1-16 MAY 1997							
UNIT TASKED	AIRCRAFT	SORTIES			BEDS		HOME BASE
		#	AM	PM	EIL	ELM	
Scheduled							
at Eielson							
8 FW/80 FS	F-16 (30)	12	10	8	195		Kunsan AB
187 FW/ANG	F-16 (30)	8	6	6	106		Montgomery, AL
366 AEW/34 BS	B-1B	4	2	2	86		Mt. Home AFB, ID
168 ARW	KC-135	2	1	1			Eielson AFB
18 WG/909 ARS	KC-135	2	1	1	65		Kadena AB
141 ARW	KC-135	4	2	3	140		Spokane, WA
210 RQS	HH-60	1			5		Kulis ANGB
Total at Eielson		33	22	21	597		
at Elmendorf							
3 WG/19 FS	F-15C	8	6	6			Elmendorf AFB
325 FW/95 FS	F-15C	8	6	6		110	Tyndall AFB, FL
18 WG/961 AACS	E-3C	1	1	0		55	Kadena AB
3 WG/962 AACS	E-3B	1	1	1			Elmendorf AFB
144 AS/169 IS	C-130	1	1			39	Salt Lake City, UT
							Kulis ANGB, AK
Total at Elmendorf		19	15	13		204	
Total Scheduled		52	37	34	597	204	
Other							
76 SOPS	Space Supp				1	2	Falcon AFB, CO
DET 460	COMMJAM				15		Eielson AFB
MPC					3		Eielson AFB
JAOC						4	Elmendorf AFB
611 ACS	GCI					5	Elmendorf AFB
TOTAL SORTIES			37	34			
MAX SORTIES ALLOWED			150				
TOTAL BEDS					616	215	
MAX BEDS AVAILABLE					745	502	



**Table 44. Cope Thunder 1997 – 3 Exercise Participants**

INTERDICTION/CAS							
5-20 JUNE 1997							
UNIT TASKED	AIRCRAFT	#	SORTIES		BEDS		HOME BASE
			AM	PM	EIL	ELM	
<b>Scheduled</b>							
<b>at Eielson</b>							
355FS/25 FS	A/OA -10	12	6	4	5		Eielson AFB/Osan AB
18 FS/36 FS	F-16 (40)	14	12	12	9		Eielson AFB/Osan AB
8 FW/35 FS	F-16 (30)	12	10	8	170		Kunsan AB
185 FW/ANG	F-16 (30)	8	6	6	113		Sioux City, IA
IX (F)SQ/RAF	GR-1/Tornado	9	7	6	160		RAF Bruggen
VAQ-134	EA-6B	4	2	2	104		Whidbey Island
18 WG/909 ARS	KC-135	2	1	1	49		Kadena AB
168 ARW	KC-135	2	2	2			Eielson AFB
171 ARW/ANG	KC-135	1	1	1	15		Pittsburgh, PA
101 ARW/ANG	KC-135	1	1	1	23		Bangor, ME
161 ARW/ANG	KC-135E	1	1	1	15		Phoenix, AZ
<b>total at Eielson</b>		<b>66</b>	<b>49</b>	<b>44</b>	<b>663</b>		
<b>at Elmendorf</b>							
18 WG/12 FS	F-15C	12	10	8		185	Kadena AB
18 WG/961 AACS	E-3B	1	1	0		65	Kadena AB
3 WG/962 AACS	E-3B	1	0	1			Elmendorf AFB
374 AW/36 AS	C-130	3	3	0		135	Yakota AB
3 WG/517 AS	C-130	4	3	0			Elmendorf AFB
JASDF/1 TAG	C-130	2	2	0		52	Komacki AB, Japan
<b>Total at Elmendorf</b>		<b>23</b>	<b>19</b>	<b>9</b>		<b>437</b>	
<b>Total Scheduled</b>		<b>89</b>	<b>68</b>	<b>53</b>	<b>663</b>	<b>437</b>	
<b>Other</b>							
RAF PSP	Support				90		
111 ASOC	ASOC				7		Camp Murray, WA
14 ASOS	R2202/TACP		40 in the field				Ft Bragg, NC
25 ASOS	R2205/TACP				10		Schofield Barracks, HI
22 STS	CCT		2 at Ft. Greely		4		McChord AFB, WA
JASDF	Stingers				13		
Hawaii ARNG/29 SID	Stingers		33 in the field		3		Ft Rueger, HI
76 SOPS	Space Supp				1	2	Falcon AFB, CO
210 RQS	HH-60	1			5		Kulis ANGB
DET 460	COMMJAM				1		
MPC					6		
JAOC						6	
<b>TOTAL SORTIES</b>			<b>68</b>	<b>53</b>			
<b>MAX SORTIES ALLOWED</b>			<b>150</b>				
<b>TOTAL BEDS</b>					<b>803</b>	<b>445</b>	
<b>MAX BEDS AVAILABLE</b>					<b>745</b>	<b>502</b>	

**Table 45. Distant Frontier 1997 Exercise Participants**

23 JUNE-8 JULY 1997

POC: Maj Dourte, 377-4969

<u>UNIT TASKED</u>	<u>AIRCRAFT</u>	#	<u>SORTIES</u>		<u>BEDS</u>		<u>HOME BASE</u>
			<u>AM</u>	<u>PM</u>	<u>EIL</u>	<u>ELM</u>	
<u>Scheduled</u>							
<u>at Eielson</u>							
14 (F)SQ/RAF	GR-1/Tomado	8	6	6	150		RAF Bruggen
29 (F) SQ/RAF	F-3	8	6	6	150		RAF Conningsby
47 (SF) SQN/RAF	C-130	2	1	1	65		RAF Lyneham
RAF/SAS					20		
RAF Permanent Party					90		
<b>Total at Eielson</b>		18	13	13	475		
<u>at Elmendorf</u>							
8 SQN/RAF	E-3D	1	0	1	<b>Off Base</b>		RAF Waddington
<b>Total at Elmendorf</b>			0	0		0	
<b>Total Scheduled</b>		18	13	13	475	0	

**Table 46. Cope Thunder 1997 – 4 Exercise Participants**

INTERDICTION							
10-25 July 1997							
UNIT TASKED	AIRCRAFT	#	SORTIES		BEDS		HOME BASE
			AM	PM	EIL	ELM	
<b>Scheduled</b>							
<b>at Eielson</b>							
35 FW/13 FS	F-16(50)	12	10	10	182		Misawa AB
388 FW/34 FS	F-16 (40)	12	10	10	168		Hill AFB, UT
188 FW/ANG	F-16 (30)	8	6	6	98		Fort Smith, AR
31 (F)SQ/RAF	GR-1/Tomado	8	6	6	63		RAF Bruggen
5 (F)SQ/RAF	F-3	8	6	6	63		RAF Conningsby
VAQ-142/132	EA-6B	4	3	3	110		NAS Whidbey Island
168 ARW	KC-135	2	1	1			Eielson AFB
190 ARW/ANG	KC-135	1	1	1	20		Forbes Fid, KS
108 ARW/ANG	KC-135	1	1	1	20		McGuire AFB, NJ
134 ARW/ANG	KC-135	1	1	1	20		McGee-Tyson, TN
203 ARS/ANG	KC-135	1	1	1	20		Hickam AFB
<b>Total at Eielson</b>		<b>58</b>	<b>46</b>	<b>46</b>	<b>764</b>		
<b>at Elmendorf</b>							
33 FW/60 FS	F-15C	12	10	10		185	Eglin AFB, FL
VFA-22/USN	F/A-18C	8	6	6		120	NAS Lemoore, CA
RAAF/82 WG	F-111	5	4	4		89	Amberley
RAAF/36 SQN	C-130	CNX					Richmond
3 WG/962 AACs	E-3C	1	1	0			Elmendorf AFB
8 SQN/RAF	E-3D	1	0	1	Off Base		RAF Waddington
47 (SF) SQN/RAF	C-130	2	1	1		65	RAF Lyneham
<b>Total at Elmendorf</b>		<b>9</b>	<b>22</b>	<b>22</b>		<b>459</b>	
<b>Total Scheduled</b>		<b>67</b>	<b>68</b>	<b>68</b>	<b>764</b>	<b>459</b>	
<b>Other</b>							
76 SOPS	Space Supp				1	2	Falcon AFB, CO
210 RQS	HH-60	1			5		Kulis ANGB
DET 460	COMMJAM				15		Eielson AFB
MPC					10		Eielson AFB
RAF/SAS					20		
RAF Permanent Party					90		Eielson AFB
JAOC						13	Elmendorf AFB
611 ACS	GCI					2	Elmendorf AFB
<b>TOTAL SORTIES</b>			<b>68</b>	<b>68</b>			
<b>MAX SORTIES ALLOWED</b>			<b>150</b>				
<b>TOTAL BEDS</b>					<b>905</b>	<b>476</b>	
<b>MAX BEDS AVAILABLE</b>					<b>745</b>	<b>502</b>	

### Appendix C: Methodology Used to Compute 168 ARW FHs

**Table 47. Methodology used to Compute Flying Hours for a PAA Increase to the 168 ARW**

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8
					Active Duty	Total FH	Total
ANG PAA	FH/PAA	% of 325	168ARW	Savings	302 FHs	Savings	\$ Savings
8	325	1.00	362.000	0.000	-	-	-
10	298	0.917	331.926	240.591	59.852	180.738	\$335,631
12	288	0.886	320.788	329.698	75.151	254.548	\$472,695
14	280	0.862	311.877	400.985	59.262	341.723	\$634,580
16	273	0.840	304.080	463.360	16.640	446.720	\$829,559
18	267	0.822	297.397	516.825	-46.031	562.855	\$1,045,222
20	261	0.803	290.714	570.289	-135.434	705.723	\$1,310,528

- 1) Column 1 is the PAA for an entire ANG Air Refueling Wing (ARW).
- 2) Column 2 is the programmed Flying Hours (FH) per an ANG Air Refueling Wing. The FHs for 8, 10, 18, and 20 PAA are from AFI 65-503, Attachment A43-1 (as of 30 March 1998). The FHs for 12, 14 and 16 PAA are interpolated.
- 3) Column 3 is the percentage of FHs per PAA for an eight PAA wing with 325 FHs.
- 4) Column 4 multiplies 362 by Column 3 to obtain the estimated FHs per PAA that would be required for each PAA increase to the 168 ARW.
- 5) Column 5 is the savings in FHs from the reduction in flying hours from the original eight PAA 168 ARW that was allocated 362 FHs per PAA in FY98.  
(362-Column 5) X 8
- 6) Column 6 is the cost or savings between the average ANG programmed FHs per PAA in column 2 and the active duty average programmed FHs per PAA of 302.
- 7) Column 7 is the total savings in FHs that results from moving PAA from an active duty squadron into the 168 ARW. (Column 1 – 8)(Column 4 – 302)
- 8) Column 8 is the savings in dollars that results from moving PAA from an active duty squadron into the 168 ARW. Each FH is multiplied by \$1,857.

## **Appendix D: Glossary of Technical Terms**

**Active (Duty) Guard Reserve (AGR).** A member of the National Guard or Reserve Component who is on full time, active duty status. Most duty is performed in their respective states and serve under Section 502(f) of Title 32, USC. Members are placed on Title 10 status when they are deployed outside the United States, Guam, Puerto Rico, or the US Virgin Islands. AGRs receive the same pay and benefits as Title 10 active duty military members.

**AMC History System (AHS).** Provides AMC the capability to perform and analyze historical data from the Global Decision Support System (GDSS) and Tanker Activity Reports.

**Air Reserve Component.** Refers to the Air National Guard and the Air Force Reserve forces.

**Channel.** Aerial Port of Embarkation/Aerial Port of Debarkation pairs between which common user airlift service may be provided on a scheduled basis. A channel does not represent the actual aircraft routing, although the two may be the same. Channels are validated by the US Transportation Command.

**Command & Control Information Processing System (C2IPS).** An integral part of the Command and Control Upgrade program, C2IPS is the primary wing level command and control system within AMC. Data bases at each node allow for sharing of C2 information through local area networking. Interfaces to and automatically updates the Global Decision Support System (GDSS).

**Global Decision Support System (GDSS).** AMC's primary execution command and control system. The primary node at Scott AFB supports the Tanker Airlift Control Center (TACC) and other HQ AMC users. GDSS is used to manage the execution of AMC airlift and tanker missions. GDSS receives airlift and air refueling schedules from ADANS, and interfaces with numerous other automated systems, including C2IPS.

**Horseblanket.** A TACC developed scheduling database designed to match air refueling requirements to the supporting air refueling units.

**Pacer CRAG.** A cockpit modernization effort (Compass, Radar, And Global Positioning System), upgrades the entire KC-135 fleet with current technology. This modification, among other things, makes it possible to reduce the KC-135 cockpit crew from three to two. In addition to manpower savings, it will significantly enhance the KC-135 reliability and maintainability.

Program Objective Memorandum (POM). Each service and defense agency annually submits their total program requirements for the next six years and includes rationale for planned changes from the current approved fiscal year defense plan baseline within the fiscal guidance.

Military Technicians. Full time employees of the Department of the Army or Air Force employed under Title 32, USC 709. Technicians are administered by State Adjutants General and who must also hold a Traditional Guard military position as a condition of employment.

Traditional Guard Personnel. These members, as a minimum, are required to attend 15 days of annual training and 48 unit training assemblies for each fiscal year. Additional training may be authorized and/or required to accomplish certain training or operational tasks or missions.

## **Appendix E: Glossary of Acronyms**

ACMI	Air Combat Maneuvering Instrumentation
AEF	Air Expeditionary Force
AFRC	Air Force Reserve Command
AGR	Active Guard Reserve (Title 32 Active Duty ANG)
AHS	AMC History System
AMC	Air Mobility Command
AMPAS	Air Mobility Performance Analysis System
ANG	Air National Guard
ANR	Alaska NORAD Region
AOR	Area of Responsibility
A/R	Air Refueling
ARC	Air Reserve Component
ARS	Air Refueling Squadron
ARTCC	Air Traffic Control Center
ARW	Air Refueling Wing
ASR	Approach Surveillance Radar
ATTF	Alaska Tanker Task Force
BAI	Backup Aircraft Inventory
BOS	Base Operating Support
C2IPS	Command and Control Information Processing System
CJCS	Chairman, Joint Chiefs of Staff
CONPLAN	Contingency Plan
CONUS	Continental United States
DTG	Date Time Group
FH	Flying Hour
GDSS	Global Decision Support System
ICAO	International Civil Aviation Organization
LRP	Long Range Plan
MAJCOM	Major Command
MOA	Memorandum of Agreement
MRO	Mission Reliability Office (at HQ AMC)
NGB	National Guard Bureau

NORAD	North American Defense
OCONUS	Outside of Continental United States
O&M	Operations and Maintenance
OPLAN	Operation Plan
OPSTEMPO	Operations Tempo
O&S	Operations and Support
PAA	Primary Aircraft Authorization
PACAF	Pacific Air Forces
PACOM	Pacific Command
PAR	Precision Approach Radar
PDM	Programmed Depot Maintenance
PERSTEMPO	Personnel Tempo
POL	Petroleum, Oils, and Lubricants
RAU	Reverse Associate Unit
SAC	Strategic Air Command
SRW	Strategic Reconnaissance Wing
STRATCOM	Strategic Command
TACC	Tanker Airlift Control Center
TDY	Temporary Duty
TTF	Tanker Task Force
UMD	Unit Manpower Document
USAFE	United States Air Force in Europe
USC	United States Code
WG	Wing



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## Vita

Major Mike Rauenhorst was born on 5 July 1965 in Milton, Florida. He graduated from Delavan Public High School, Delavan, Minnesota, in 1983. He received his commission from the Air National Guard's Academy of Military Science in 1987 and graduated from Mankato State University with a BS in Aviation Management and a minor in Economics in 1988.

Major Rauenhorst enlisted in the United States Marine Corps Reserve in 1983 as a combat engineer mechanic. He later transferred to the South Dakota Air National Guard's 114<sup>th</sup> Tactical Fighter Group (A-7s) after being selected for a part-time intelligence officer position. He attended the USAF Intelligence Applications Officer school at Goodfellow AFB in 1988 and graduated as an honor graduate.

The recently activated Alaska Air National Guard's 168<sup>th</sup> Air Refueling Wing selected Major Rauenhorst as their organization's first full-time intelligence officer in 1989. He reported to Eielson AFB in 1990 and later served in both Desert Shield and Desert Storm operations. He has also served as the wing's aircrew tactics and tactical deception officer, and was the ANG's 1996 Tactical Deception Officer of the year and the USAF and PACAF's 1996 Reserve Intelligence Officer of the Year. In May 1997, Major Rauenhorst entered the School of Logistics and Acquisition Management, Air Force Institute of Technology as part of the Advance Study of Air Mobility (ASAM) program.

Permanent Address: P.O. Box 55983  
North Pole, AK 99705

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE June 1998	3. REPORT TYPE AND DATES COVERED Graduate Research Paper	
4. TITLE AND SUBTITLE  AIR REFUELING OPERATIONS IN THE NORTH PACIFIC: IS THERE A MORE EFFICIENT METHOD?			5. FUNDING NUMBERS	
6. AUTHOR(S)  Michael J. Rauenhorst, Maj, AKANG				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)  Air Force Institute of Technology 2750 P Street WPAFB OH 45433-7765			8. PERFORMING ORGANIZATION REPORT NUMBER  AFIT/GMO/LAS/98J-15	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)  AMWC/WCDA 5656 Texas Avenue Ft Dix AIN NJ 08640			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION AVAILABILITY STATEMENT  Approved for public release; distribution unlimited.			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) <p>The 1997 Air Force Long Range Plan states the Air Force will continue to rely on the Air Reserve Component (ARC) in an integrated Total Force. Driven by the desire to maximize efficiency and operational effectiveness within allocated resources, the Air Force will continue to look for new opportunities, to include examining ARC involvement in new mission areas and optimizing the reverse associate unit. The best location to attempt either a KC-135 reverse associate unit or a non-traditional Air National Guard KC-135 squadron might be in the North Pacific Theater. Both options would help reduce the operations tempo of KC-135 squadrons, might help with aircrew retention, and would increase the reliability and cost effectiveness of air refueling operations in the North Pacific.</p> <p>This paper performs a cost-benefit analysis on several proposals to satisfy the air refueling requirements in the North Pacific in a more cost efficient manner than today's current operations. Results of this study reflect an overall cost savings and more efficient use of air refueling resources with an increase in the number of KC-135Rs assigned to or associated with the 168th Air Refueling Wing. This paper examined several basing options and the associated costs and benefits.</p>				
14. SUBJECT TERMS Reverse Associate Unit, Air National Guard, KC-135, Eielson, Alaska, Air Refueling, Tanker, AMC, PACAF, 168 ARW, Cost Benefit Analysis, AGR, Pacific, Tanker Task Force, CORE, PAA, BAI, Flying Hours, Basing Option, Manpower, Operations Tempo, Personnel Tempo			15. NUMBER OF PAGES 132	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT  UNCLASSIFIED	18. SECURITY CLASSIFICATION OF THIS PAGE  UNCLASSIFIED	19. SECURITY CLASSIFICATION OF ABSTRACT  UNCLASSIFIED	20. LIMITATION OF ABSTRACT  UL	

## AFIT RESEARCH ASSESSMENT

The purpose of this questionnaire is to determine the potential for current and future applications of AFIT research. **Please return completed questionnaire to:** AFIT/LAC BLDG 641, 2950 P STREET, WRIGHT-PATTERSON AFB OH 45433-7765 or e-mail to [dvaughan@afit.af.mil](mailto:dvaughan@afit.af.mil) or [nwiviott@afit.af.mil](mailto:nwiviott@afit.af.mil). Your response is **important**. Thank you.

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